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NATIONAL DIRECTORY
OF
COMMODITY SPECIFICATIONS

1932

DEPARTMENT OF COMMERCE
UNITED STATES OF AMERICA

U. S. DEPARTMENT OF COMMERCE
R. P. LAMONT, Secretary
BUREAU OF STANDARDS
GEORGE K. BURGESS, Director

NATIONAL DIRECTORY OF COMMODITY SPECIFICATIONS

Classified and Alphabetical Lists and Brief Descriptions of Specifications of National Recognition

MISCELLANEOUS PUBLICATION No. 130
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direction of A. S. McAllister, Chief of the
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CONTENTS

Page
Foreword 1
Introduction 3
Classified list of specifications 5
  Animals and animal products (except wool and hair) 5
    000 Animals 5
    010 Meats 6
    020 Dairy products 11
    030 Fish 14
    040 Animal and fish oils, fats, and greases 15
    050 Hides and skins, raw (except furs) 17
    060 Leather and leather manufactures 17
    070 Furs 19
    090 Miscellaneous animal products 19
  Vegetable food products and beverages 21
    100 Grains and preparations 21
    110 Fodders and feeds 26
    120 Vegetables 31
    130 Fruits and nuts 39
    140 Oil seeds and vegetable oils and fats 49
    150 Cocoa, coffee, tea, spices, and leavening agents 52
    160 Sugar, molasses, sirup, honey, and confectionery 58
    170 Beverages 60
  Vegetable products, except food, fibers, and wood 65
    200 Rubber and similar gums and manufactures thereof 65
    210 Gums, resins, and balsams 73
    220 Crude drugs and essential oils 74
    230 Dyeing and tanning materials of vegetable origin 75
    240 Seeds (except oil seeds and spice seeds) 75
    250 Nursery and greenhouse stock 76
    260 Tobacco 76
    280 Starch and vegetable glue 77
    290 Miscellaneous vegetable products 77
  Textiles 78
    300 Cotton, cotton fabrics, and cotton knit goods 78
    310 Manufactures of cotton 86
    320 Jute and jute manufactures 89
    330 Flax, hemp, and ramie 90
    340 Other vegetable fibers, straw, or grass 92
    360 Wool and hair and manufactures thereof 92
    370 Silk and manufactures thereof 95
    390 Miscellaneous textile products 97
  Wood and paper 101
    400 Lumber (logs, timber, and other manufactured or partly manufactured wood) 101
    410 Lumber for building and factory use 115
    420 Manufactures of wood (except furniture) 126
    430 Furniture of wood 131
    470 Paper (except printed matter) 133
    480 Books and other printed matter 144
    490 Miscellaneous paper products 145
  Nonmetallic minerals 146
    500 Coal, petroleum, asphalt, and mineral wax 146
    510 Stone, sand, and cementitious materials 166
    520 Glass and glass products 199
    530 Clay and clay products 202
    540 Abrasive materials, asbestos, and chalk 209
    550 Mica, rare minerals 211
    560 Precious stones and imitations 211
    570 Sulphur, magnesia, salt, and graphite 212
    590 Miscellaneous nonmetallic minerals 212

Classified list of specifications—Continued.

Page
Ores, metals, and manufactures (except machinery, vehicles, and electrical supplies) 214
- 600 Iron and steel 214
- 610 Iron and steel manufactures 250
- 620 Ferro-alloying ores, metals and manufactures 277
- 630 Aluminum, antimony, bismuth, cadmium, and cobalt 281
- 640 Copper, brass, and bronze 283
- 650 Lead, mercury, and nickel 294
- 660 Precious metals, metal jewelry, and plated ware 297
- 670 Clocks, watches, and dials 297
- 680 Tin and zinc 297
- 690 Miscellaneous ores, metals, alloys, and metal manufactures 299

Machinery and vehicles 302
- 700 Power-generating machinery (except electric) 302
- 710 Electrical machinery and supplies 312
- 720 Vehicles (except agricultural vehicles and steam locomotives) 363
- 730 Agricultural machinery and implements 377
- 740 Construction, conveying, and hoisting machinery 378
- 750 Mining, oil well, and pumping machinery 379
- 760 Metal-working machinery 382
- 770 Textile, sewing, and shoe machinery 385
- 780 Miscellaneous industrial plant machinery 385
- 790 Miscellaneous industrial plant auxiliary equipment 388

Chemicals and allied products 393
- 800 Coal-tar products 393
- 810 Medicinal and pharmaceutical preparations 398
- 820 Acids (except coal-tar) and anhydrides, alcohol, etc 404
- 830 Other chemical compounds 408
- 840 Pigments, paints, and varnishes 422
- 850 Fertilizers and fertilizer materials 432
- 860 Explosives, fireworks, and ammunition 433
- 870 Soaps, cosmetics, and toilet preparations 433
- 880 Disinfectants and water treatments 436
- 890 Miscellaneous chemical products 439

Commodities not elsewhere classified 440
- 910 Scientific and professional apparatus and supplies 440
- 920 Musical instruments 449
- 930 Office, printing, lithographic, and educational supplies 449
- 940 Toys, athletic, and sporting goods 451
- 950 Containers 454
- 970 Fire-extinguishing apparatus and supplies 472
- 980 Brushes and brooms 475
- 990 Miscellaneous articles 478

Directions for obtaining copies of specifications 481
Names and addresses of standardizing agencies 481
Index and alphabetical list of commodities 501

NATIONAL DIRECTORY OF COMMODITY SPECIFICATIONS

FOREWORD TO FIRST EDITION ISSUED IN 1925

By Herbert Hoover

Specifications are the formulated, definite, and complete statements of what the buyer requires of the seller. They must be adapted to the best practice of production and distribution. Their formulation requires the services of chemists, physicists, engineers, and whatnot. But beyond this it requires something that has too often been neglected, and that is the added experience of the manufacturer, the producer, and the user. No economy is to be obtained by formulating such a specification for an article as will require that it be specially manufactured when an article largely produced for commercial consumption will give equal service, or by the setting up of such requirements as will necessitate increased cost of production without compensation in service.

At the beginning of the present administration the Department of Commerce instituted a review of Federal purchasing specifications with a view to a better formulation of standards, simplifications, and more accurate presentation of specifications in Federal purchases, in cooperation with committees from the various industries. Upon the erection of the Bureau of the Budget a Federal Specifications Board was created under the budgetary powers, members of the Department of Commerce acting as chairman and secretary, and a membership representing the different departments of the Government. The Federal Specifications Board has had under review Federal specifications, and in the formulation of such specifications has not only made the necessary scientific investigations, using the facilities of the National Bureau of Standards and other Government laboratories, but has called into consultation representatives of the manufacturing industries concerned in order that Government purchases should be properly adapted to the manufacturing processes and normal stocks and materials of the country. A very considerable amount of economy has been effected in the purchase of Federal Government supplies by these methods and their better adaptation to commercial practice.

The State purchasing agencies have from time to time sought the assistance of the department in the formulation of standards, specifications, and methods of tests for their purchases. With the approval of the State governors I called a conference of the purchasing agents of the States on May 25, 1923, to ascertain in what way the department could best be of service to the public purchasers in connection with the formulation, selection, or unification of specifications and in the development of methods of testing. This conference expressed its approval of the proposal of the department to review the specifications in use and to formulate and issue a handbook or encyclopedia for the use of public purchasing agents covering the entire field of standards, specifications, simplifications, and tests which may be determined as the best adapted for public purchases, the publication in each instance to be formulated in consultation with the different agencies particularly concerned.

With a view to the better organization of all of the public purchasing agencies and the establishment of cooperation with the technical and scientific bodies of the country, together with the experience of other large buyers and of manufacturing representatives there was created an advisory board, the members of which are official representatives of 14 leading national organizations interested in the preparation and unification of specifications.

Our engineering and professional societies, especially the American Society for Testing Materials, and the Society of Automotive Engineers have been long engaged, as has more recently the American Engineering Standards Committee,[1] in the preparation and standardization of certain types of specifications; our university laboratories, our great industrial laboratories, the engineers in our large industries, have for years been developing specifications in a great multitude of materials. Many of these specifications have lain dormant for lack of use by the consumer in his demands upon the producer. Others of them have not had applied to them the test of commercial experience in production. It is our purpose to adopt whatever is good, to put it under review as to its practical application, and, as we have done hitherto, to call in the expert manufacturer and producer for his cooperation and advice.

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[1] Now the American Standards Association.

The direct purpose of any wise cooperative effort in the adoption of specifications is thus to secure constructive application of scientific knowledge to service requirements; to coordinate similar demands and eliminate unessential differences; to balance increases in cost against probable service improvements, taking full advantage of existing commercial varieties; and to formulate adequate test or inspection methods—all this resulting in the development of greatly improved products, vital support to the national movement toward simplification of lines, processes, and business practices, and marked lowering of costs and prices. When such a cooperative undertaking combines Federal, State, and municipal groups, as in the present instance, we have the additional advantages of the unequaled facilities of Government laboratories in investigation; the broadcasting, with Government approval, of many little known but excellent specifications developed by private industries; the prestige of Government specifications leading to wide voluntary adoption in commerce; and the unification of demand in vast purchases with incalculable benefit in raising and stabilizing the quality of American production.

INTRODUCTION

This publication is a revised edition of the National Directory of Commodity Specifications, first published in 1925. In it will be found listed the standards and specifications of trade associations, technical societies, and organizations that are representative in a national way of industry or some branch of industry, as well as the standards and specifications of governmental agencies that represent the Federal Government as a whole. It is a compilation of current nationally recognized specifications.

The same decimal system of classification of commodities has been used in this edition as was used with the first edition, some minor changes and additions being made to take care of new material.

The classification system used tends to throw together specifications and standards relating to the same subjects so that specification-making bodies may take note of or be forewarned of duplication of material. Moreover, a special effort has been made to increase the usefulness of the directory to the purchaser desiring to use nationally recognized specifications. For example, where the use to which a commodity is put is not self-evident from the title of the specification a brief statement of this use has been given, if known. There is also given a brief summary of each specification so that the reader may to some extent judge for himself whether the scope of the specification fits his particular needs. Cross-referencing has been used to tie up related specifications.

To obtain the best results with the directory full use should be made of the index on pages 501 to 548. In this index the commodities are listed alphabetically, and references are given to the classification groups in the body of the directory in which the specifications for the particular commodities appear. Directions for obtaining copies of the specifications will be found on page 481.

Besides the Directory of Specifications, the Department of Commerce is preparing an Encyclopedia of Specifications. This encyclopedia contains the actual text of the specifications as contrasted with the directory which contains titles with brief descriptive items. Two parts of the encyclopedia have already been published, (1) Standards and Specifications in the Wood Using Industries, published in June, 1927, and (2) Standards and Specifications for Nonmetallic Minerals and their Products, published in March, 1930. These two books cover the classification groups 400–499 and 500–599, respectively, of the National Directory of Specifications. In these parts are to be found the actual text of the nationally recognized specifications under the above classification groups in existence when the books were prepared. Some of the specifications referred to in the present edition of the directory will be found to be revisions of specifications included in the parts of the encyclopedia already published. In a few cases there are references to specifications formulated since the two volumes of the encyclopedia were issued.

CLASSIFIED LIST OF SPECIFICATIONS

000-099 ANIMALS AND ANIMAL PRODUCTS

Except Wool and Hair

000-009 ANIMALS

001. CATTLE

001.1 MILK COWS

U. S. Gov., Dept. of Agriculture. Bureau of Animal Industry. Dept. Circular 249; 1928. Tuberculin Testing of Livestock. Methods of testing recognized by Bur. of Animal Ind. and various State officials, not mandatory except where included under State laws or regulations. Description and method of procedure for the subcutaneous or thermal test, the intradermic or skin test, and the ophthalmic or eye test.

001.2 BEEF CATTLE

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Circular 28; 1928. Market Classes and Grades of Calves and Vealers. Permissive standards, includes feeder and stocker calves, definitions of 5 grades as regards build, shape, and outline of body, quantity, quality, and distribution of fat, quality of flesh, proportion of bones, etc., definitions of slaughter animals the same as in S. R. A., B. A. E. 113. Grades used in market news reports.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Dept. Bull. 1360; 1926. Market Classes and Grades of Livestock. Permissive standard, useful for market reports, schedule of market classes and grades for cattle as steers, heifers, etc., subclasses slaughter, feeder, stocker, age selection, weight selection, and grades covered by each, no definitions of grades included.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Dept. Bull. 1464; 1927. Market Classes and Grades of Cattle. Permissive standards for slaughter cattle and for feeders and stockers, definitions of 5 to 7 grades each of steers, heifers, cows, bulls, and stags as regards build, shape, and outline of body, quantity, quality, and distribution of fat, quality of flesh, proportion of flesh to bones, etc., the grade definitions for slaughter cattle being the same as given in S. R. A., B. A. E. 112. Grades used in market news reports.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 112; 1928. Official U. S. Standards for Grades of Slaughter Cattle. Permissive standards, definitions of 5 to 7 grades each of slaughter steers, heifers, cows, bulls, and stags, as regards build, shape, and outline of body, quantity, quality, and distribution of fat, quality of flesh, proportion of flesh to bones, etc.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 113; 1928. Official U. S. Standards for Grades of Vealers and Slaughter Calves. Permissive standards, definitions of vealer and calf, of 3 weight selections, and of 6 grades as regards build, shape, and outline of body, quantity, quality, and distribution of fat, quality of flesh, proportion of flesh to bones, etc.

002. HOGS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Dept. Bull. 1360; 1926. Market Classes and Grades of Livestock. Permissive standards useful for market reports, schedule of market classes and grades of hogs, as barrows, sows, etc., subclasses feeder, slaughter, use selection as butcher or packer, weight selection, and grades inclusive in each, no definition of grade included.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative Standards for Grades of Slaughter Hogs; 1930. Permissive standards, definitions of small, intermediate, and large types, definitions of 6 grades of the intermediate of slaughter barrows and gilts and slaughter sows, as regards body proportions, conformation, relative shape of parts of body, finish, quality, etc., grades illustrated.

003. SHEEP

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Dept. Bull. 1360; 1926. Market Classes and Grades of Livestock. Permissive standards useful for market reports, schedule of market classes and grades of sheep, as ewes, wethers, etc., subclasses slaughter, feeders, age selection, weight selection, and grades included in each, no definition of grade included.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative Standards for Grades of Slaughter Lambs; 1929. Permissive standards, definitions of 6 grades as regards compactness, shape, and outline of body, amount, quality and distribution of fat, size of joints, proportion of bone, etc. Grades used in market news reports.

004. HORSES

004.1 WORK HORSES

005. MULES, ASSES, AND BURROS

005.1 MULES

005.2 ASSES

005.3 BURROS

007. POULTRY

007.0 GENERAL ITEMS

U. S. Gov., Congress, 43 Stat. 822, 844–845; 1925. An act making appropriations for the Dept. of Agriculture for the fiscal year ending June 30, 1926. For enabling the Sec. of Agriculture to investigate and certify to shippers and other interested parties the class, quality, and/or condition of cotton, and fruits, vegetables, poultry, butter, hay when offered for shipment in interstate shipment or received at central markets.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S.R.A., B.A.E. 103 and Supplement No. 1; 1926. Rules and Regulations of the Sec. of Agriculture Governing the Inspection and Certification of Live Poultry. Regulations regarding where inspection service is available, who may obtain inspection, form of application, certification, fees.

007.1 CHICKENS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative Classes and Subclasses for Live Poultry; 1928. Permissive standards, includes for chickens a description of classes for U. S. and Mediterranean chickens, as broilers, chickens, stags, capons, fowl, and old cocks, with weight limits and general description of each class.

007.2 TURKEYS

U. S. Gov., Dept of Agriculture, Bureau of Agricultural Economics. Tentative Classes and Subclasses for Live Poultry; 1928. Permissive standards, includes for turkeys a description of 3 classes and 4 subclasses, with weight limits and general description of each.

007.3 DUCKS

U. S. Gov., Dept of Agriculture, Bureau of Agricultural Economics. Tentative Classes and Subclasses for Live Poultry; 1928. Permissive standards, includes for spring ducks, ducks, and Muscovy ducks, a general description of subclasses and required weight limits.

007.4 GEESE

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative Classes and Subclasses for Live Poultry; 1928. Permissive standards, includes for geese and chinese or swan geese a general description and weight limits for subclasses.

010–019 MEATS

010. GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Meat. Preparation of sample, determination of moisture, ash, crude fat, total phosphorus, total nitrogen, preservatives, creatin, and tentative methods for determination of ammonia, nitrates, nitrites, starch, glycogen, sugar, metals, coloring matters, nitrogen in various combinations, meat bases, and soluble phosphorus.

U. S. Gov., Congress. Public No. 361, 71st Cong., June 17, 1930, Sec. 306. Imported meat act. Requirements applicable to imported meats that they be wholesome, healthful, and fit for human food and contain no dye, chemical, or ingredient rendering them unfit.

U. S. Gov., Congress. 34 Stat. 674 of June 30, 1906, and 34 Stat. 1260 of Mar. 4, 1907. Meat inspection act. For meat entering interstate or foreign commerce, requirements for the inspection of animals and meat at the slaughter house or packing plant by inspectors of the Dept. of Agriculture and labeling of such meats as passed or condemned.

U. S. Gov., Congress. 34 Stat. 768. June 30, 1906, as amended. (For text see S. R. A., F. D. No. 1, 1930 of Food, Drug, and Insecticide Administration of Dept. of Agriculture.) Federal food and drugs act. An act to prevent the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors, and for regulating traffic therein. Defines conditions which will be considered as adulteration or misbranding for drugs, confectionery, and foods, adopts for drugs the standards of U. S. Pharmacopoeia and Nat. Formulary.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 98, Amend. 1, 1929. Rules and Regulations of the Sec. of Agriculture Governing the Investigation and Certification of Class, Quality (Grade), and Condition of Meats and Meat Food Products. Regulations regarding where grading service may be obtained with designation of important central markets, who may apply and form of application, fees.

U. S. Gov., Dept. of Agriculture. Bureau of Animal Industry. B. A. I. Order 211, revised, 1922, with amendments. Regulations Governing the Meat Inspection of U. S. Dept. of Agriculture. For meat and meat products entering into interstate or foreign commerce, mandatory requirements on inspection of animals and carcasses, defects and disease indications requiring condemnation of meat, branding and labeling of meat and of containers.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 1; 1930. Regulations for Enforcement of Federal Food and Drugs Act. Act applies to foods and drugs shipped in interstate or foreign commerce, standard methods of analysis to be those of U. S. Pharmacopoeia and Nat. Formulary and of Assn. of Official Agricultural Chemists, regulations regarding the labeling of drugs that do not meet the standards of U. S. Pharmacopoeia or Nat. Formulary, regulations on powders, on poisonous and deleterious ingredients, and on colors and preservatives, ingredients which require a statement on labels, etc. Includes text of act as amended.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Meats. General definitions of beef, veal, mutton, lamb, pork, venison, dry salt meat, corned meat, sweet pickled meat, dried meat, smoked meat, canned meat, hamburg steak, potted meat, sausage meat, meat loaf, brawn, headcheese, souse, scrapple, lard.

011. BEEF AND VEAL

011.1 BEEF CARCASSES

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Dept. Bulletin 1246; 1927. Market Classes and Grades of Dressed Beef. Covers official standards given in S. R. A., B. A. E. 99 with more explanatory and descriptive material and illustrations.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 99; 1926. Official U. S. Standards for Grades of Carcass Beef. Permissive standards, definitions of 6 and 7 grades each of steer, heifer, cow, bull, and stag carcasses as regards build, shape, and contour of carcass, thickness, color, character and distribution of fat, thickness, firmness, and strength of muscle fiber, quality of juices, etc.

U. S. Gov., Federal Specifications Board. 619a; 1929. Beef. For fresh dressed carcasses of steers, chilled or frozen, for quarters, briskets, chucks, flanks, and loins, requirements on color grain, and marbling of flesh, weight limits of carcasses and quarters, prepared and inspected according to regulations of U. S. Dept. of Agriculture and the imported meat act.

References.—Definitions, methods of analysis, food regulations. *See* 010. Veal carcasses. *See* 011.8. Beef and veal cuts. *See also* 011.91.

011.2 BEEF HEARTS

U. S. Gov., Federal Specifications Board. 566a; 1928. Beef Hearts. For fresh hearts, chilled and frozen classes, requirements on general quality, permissible age of frozen hearts, prepared in accordance with regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—Definitions, methods of analysis, food regulations. *See* 010.

011.3 BEEF KNUCKLES

011.4 BEEF AND VEAL LIVERS

U. S. Gov., Federal Specifications Board. 568a; 1928. Beef livers. For fresh livers, chilled or frozen, requirements on general quality, conformity, and weight, prepared according to regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—Definitions, methods of analysis, food regulations. *See* 010.

011.5 BEEF KIDNEYS

U. S. Gov., Federal Specifications Board. 567a; 1928. Beef Kidneys. For fresh kidneys, chilled and frozen classes, maximum time limit for acceptance of frozen kidneys after freezing, preparation in accordance with regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—Definitions, methods of analysis, food regulations. *See* 010.

011.6 BEEF TONGUES

References.—Canned beef tongue. *See* 018.11.

011.7 OXTAILS

011.8 VEAL CARCASSES AND CUTS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Dept. Circular No. 103; 1930. Market Classes and Grades of Dressed Veal and Calf Carcasses. Includes descriptions, illustrations, and definitions of grades, definitions of 6 grades of veal carcasses and of 6 grades of calf carcasses as regards conformation, quantity, quality, and distribution of fat, quality of flesh, size and hardness of bones, weight classes.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 114; 1928. Official U. S. Standards for Grades of Veal and Calf Carcasses. Permissive standards, definitions of 3 weight selections of steer, heifer, and bull carcasses, definitions of 6 quality grades as regards form, shape, and contour of carcass, quantity, quality, and distribution of fat, character and quality of flesh, for veal and calf.

U. S. Gov., Federal Specifications Board. 572a; 1928. Veal. For fresh veal, chilled or frozen, requirements on general quality of sides and hindquarters, weight limits for sides, prepared according to regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act, and imported meat act.

References.—Definitions, methods of analysis, food regulations. *See* 010. Fresh veal cuts. *See also* 011.91.

011.9 MISCELLANEOUS SPECIFICATIONS FOR BEEF AND VEAL

011.91 Fresh Beef and Veal Cuts

American Hospital Assn. Bulletin No. 36; 1923. Specifications for Purchase of Meats. Includes specifications for beef and veal, including limiting weights of cuts and general class and age of animal from which obtained.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Dept. Bull. 1246; 1927. Market Classes and Grades of Dressed Beef. Wholesale and Retail Cuts of Beef. Standard cuts illustrated, with percentage of total carcass weight represented by each wholesale cut, descriptions of properties of 7 quality grades of wholesale cuts graded on same basis as carcasses, permissive standards for steer, heifer, and cow beef.

References.—Other specifications for fresh beef and veal. See 011.1, 011.8. Definitions, methods of analysis, food regulations. *See* 010.

011.94 Smoked Beef and Veal

References.—Dried beef and veal. *See* 018.13.

011.95 Pickled Beef and Veal

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Barreled salt pickled beef, including barreled extra family or extra plate beef, family or plate beef, packet or light family beef, and mess beef, beef portions or cuts that are included in each grade.

References.—Definitions, methods of analysis, food regulations. *See* 010.

012. PORK, HAM, AND BACON

References.—Fresh pork cuts. *See* also 012.91.

012.1 PORK CARCASSES

012.2 PORK LOINS

U. S. Gov., Federal Specifications Board. 571a; 1928. Pork. For fresh pork, chilled or frozen, requirements on trim and weight limits for loins, hams, shoulders and Boston butts, prepared according to regulations of and under inspection of Dept. of Agriculture, also in conformity with Federal food and drugs act and imported meat act.

References.—Definitions, methods of analysis, food regulations. *See* 010. Dry salt cuts. *See also* 012.92. Fresh pork cuts. *See also* 012.91.

012.3 HAMS AND SHOULDERS

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Dry salt meats, including long cut hams, south staffordshire hams, and manchester hams. Requirements on portions to be included in piece and portions to be removed or trimmed off.

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Dry salt meats, including regular shoulders, New Orleans shoulders, and square shoulders of pork. Requirements on portions to be included in piece and portions to be removed.

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Green or sweet pickled meats, including standard picnics and New York cut shoulders. Requirements on portions to be included in the cut, shaping and trimming.

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Green or sweet pickled meats, standard hams, and skinned hams. Requirements on portions to be included in the cut and trimming.

U. S. Gov., Federal Specifications Board. 565a; 1928. Smoked Sweet-Pickled Hams. One class for local deliveries and immediate consumption and second class for storage or shipment to distant station, requirements on general quality, weight limits, permissible fat, kind of smoke, and length of smoking, prepared in accordance with regulations of and under inspection of Dept. of Agriculture, also in conformity with Food and Drugs Act and Imported Meat Act.

U. S. Gov., Federal Specifications Board. 571a. 1928; Pork. For fresh pork, chilled or frozen, requirements on trim and weight limits for loins, hams, shoulders, and Boston butts, prepared according to regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—Definitions, methods of analysis, food regulations. *See* 010. Fresh pork cuts. *See also* 012.91.

012.4 PORK RIBS

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Dry salt meats, including rough backs, rib backs, and rib bellies. Requirements on portions to be included in cut and portions to be removed.

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Dry salt meats, including short rib sides, extra short clear sides, extra short rib sides, and short clear sides of pork. Requirements on portions to be included in cut and portions to be removed.

References.—Definitions, methods of analysis, food regulations. *See* 010. Fresh-pork cuts. *See also* 012.91.

012.5 BACON

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Standard Packs. For sliced bacon, standard sizes of consumer packages by weight, number of packages packed in a shipping container.

U. S. Gov., Federal Specifications Board. 559a; 1928. Canned Bacon. From selected, dry salt, clear bellies, requirements on general quality, freedom from defects and poor material, weight limits, temperature and length of smoking, prepared in accordance with regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

U. S. Gov., Federal Specifications Board. 560a; 1928. Smoked Sweet Pickled Bacon. Of two classes, for local delivery and immediate consumption, and for storage or shipment to distant station, made from clear bellies, requirements on general quality, freedom from defects, weight limits, temperature and length of smoking, prepared in accordance with regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—Dry salt bellies and sides. *See also* 012.92. Sweet pickled bellies. *See also* 012.94. Definitions, methods of analysis, food regulations. *See* 010.

012.9 MISCELLANEOUS SPECIFICATIONS FOR PORK, HAM, AND BACON

012.91 Fresh Pork

American Hospital Assn. Bulletin No. 36; 1923. Specifications for the Purchase of Meats. Includes pork specifications, including limiting weights of cuts and general class and age of animal from which obtained.

References.—Definitions, methods of analysis, food regulations. *See* 010. Other fresh pork. *See* 012.1–012.5.

012.92 Dry or Salt Pickled Pork

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Barrelled salt pickled pork, including mess pork, short cut mess or New York family pork, fat back pork, ham butt pork, bean pork, and clear plate pork, requirements on portions or cuts to be included and parts to be excluded in each piece and trim.

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Dry salt meats, including clear bellies, english bellies, short fat backs of pork. Requirements on portions to be included and portions to be removed, nonpermitted defects.

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Dry salt meats, including long clear sides and short clear sides of pork. Requirements on portions to be included in cut and portions to be removed.

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Dry salt meats, including regular plates, clear plates, and jowl butts of pork. Requirements on portions to be included in cut and portions to be excluded.

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Dry salt meats, including wiltshire sides, cumberland sides, dublin middles, long rib sides, birmingham sides, south staffordshire sides, yorkshire sides, irish cut sides, english short clear backs, and english rib backs of pork. Requirements on portions to be included in piece and portions excluded.

References.—Hams and shoulders, dry salt. *See also* 012.3. Ribs, dry salt. *See also* 012.4. Definitions, methods of analysis, food regulations. *See* 010.

012.93 Sugar Cured Pork

012.94 Sweet Pickle Cured Pork

New York Produce Exchange. Rules Regulating the Provision Trade; 1922. Description of Meats. Green or sweet pickled meats, including rib bellies, clear bellies (square and seedless). Requirements on portions to be included in cut, removal of bone, trimming, etc.

References.—Hams and shoulders, sweet pickled. *See* 012.3. Bacon, sweet pickled. *See* 012.5. Definitions, methods of analysis, food regulations. *See* 010.

012.95 Smoked Pork

References.—Hams and shoulders, smoked. *See* 012.3. Smoked bacon. *See* 012.5. Definitions, methods of analysis, food regulations. *See* 010.

014. MUTTON AND LAMB

014.1 LAMB CARCASSES AND CUTS

American Hospital Assn. Bulletin No. 36; 1923. Specifications for the Purchase of Meats. Includes specifications for lamb, including limiting weights of cuts and general class and age of animal from which obtained.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Dept. Bull. 1470; 1927. Market Classes and Grades of Dressed Lamb and Mutton. Permissive standards for market news or as a basis for contracts, for lamb carcasses, definitions of six grades as regards form and contour of carcass, quantity, quality, and distribution of fat, thickness, color, and fineness of grain of flesh, etc., definitions of grades of wholesale cuts.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 123; 1931.

Official U. S. Standards for Grades of Lamb Carcasses, Yearling Mutton, and Mutton Carcasses. For lamb carcasses, permissive standards, definitions of 5 grades as regards conformation, quantity, quality, and distribution of fat, quality of flesh, proportion of flesh to bone and of fat to lean meat.

References.—Definitions, methods of analysis, food regulations. *See* 010.

014.2 MUTTON LOINS

014.3 CARCASSES, MUTTON

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Dept. Bull. 1470; 1927. Market Classes and Grades of Dressed Lamb and Mutton. Permissive standards for market news or as a basis for contracts, for mutton carcasses definitions of 6 grades of each of yearling mutton and of mature mutton carcasses as regards form and contour of carcass, quantity, quality, and distribution of fat, thickness, color, and fineness of grain of flesh, etc., definitions of grades of wholesale cuts.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 123; 1931. Official U. S. Standards for Grades of Lamb Carcasses, Yearling Mutton, and Mutton Carcasses. For yearling mutton and for mutton carcasses, permissive standards, definitions of 5 grades as regards conformation, quantity, quality, and distribution of fat, quality of flesh, proportion of flesh to bone and of fat to lean meat.

U. S. Gov., Federal Specifications Board. 570a; 1928. Mutton. For fresh mutton, chilled or frozen, requirements on general quality and trim of carcasses, hind quarters, legs, and racks, permissible proportion of ewes among delivered carcasses, prepared according to regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—Definitions, methods of analysis, food regulations. *See* 010.

015. POULTRY AND GAME

015.1 CHICKENS

American Hospital Assn. Bulletin No. 36; 1923. Specifications for the Purchase of Meats. Includes specifications for chicken, including limiting weights, general class and age of fowl.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards and Grades for Dressed Poultry; 1931. Permissive standards for broilers, fryers, roasters, stags, cocks, capons, and fowl, definitions of 4 quality grades for each class dependent on quality of flesh, fat covering, condition of skin, quality of dressing, permissible defects, classification according to age, sex, weight, method of plucking, dressing, finishing, chilling and packing.

U. S. Gov., Federal Specifications Board. PP–C–251; 1931. Dressed Chickens (Broilers, Fryers, and Roasters). For chilled, for frozen, and for fresh killed, for undrawn or drawn, of each of above types, definitions of 2 quality grades of each type as regards quality of flesh, color, dressing, freedom from deformities, torn skin, bruises, etc., permissible time in frozen condition for frozen chickens.

References.—Fowl. *See also* 015.3. Definitions, methods of analysis, food regulations. *See* 010. Inspection rules. *See* 015.0. Live chickens. *See* 007.1.

015.2 DUCKS

References.—Live ducks. *See* 007.3.

015.3 FOWL

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards and Grades for Dressed Poultry; 1931. Permissive standards for dressed fowl included, definitions of 4 quality grades dependent on amount of flesh and fat, quality of dressing, permissible kinds and amounts of defects.

U. S. Gov., Federal Specifications Board. PP–F–611; 1931. Dressed (Fricassee) Fowl. For chilled, frozen, and fresh killed, drawn and undrawn, definitions of 2 quality grades as regards quality of flesh, dressing, freedom from excessive fat, deformities, torn skin, bruises, etc., color, permissible length of refrigeration for frozen fowl.

References.—Definitions, methods of analysis, food regulations. *See* 010. Inspection rules. *See* 015.0. Live poultry. *See* 007.

015.4 GEESE

References.—Live geese. *See* 007.4.

015.5 TURKEYS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards and Grades for Dressed Poultry; 1931. Permissive standards for dressed young hen turkeys, old hens, and old tom turkeys, definitions of 4 quality grades dependent on amount of flesh and fat, permissible defects, classification according to weight, method of plucking, dressing, finishing, chilling, packing.

U. S. Gov., Federal Specifications Board. PP–T–791; 1931. Dressed Turkeys. For chilled, frozen, and fresh killed, undrawn, definitions of 2 quality grades as regards fullness of flesh, quality of flesh, dressing, freedom from bruises, torn flesh, etc., minimum weights, permissible time under refrigeration for frozen birds.

References.—Denitions, methods of analysis, food regulations. *See* 010. Inspection rules. *See* 015.0. Live turkeys. *See* 007.2.

016. HORSE MEAT

016.0 GENERAL ITEMS

U. S. Gov., Congress. 41 Stat. 241; July 24, 1919. Horse meat act. Requirements on labeling of horse meat as "horse meat" under regulations prescribed by Sec. of Agriculture.

U. S. Gov., Dept. of Agriculture. Bureau of Animal Industry. B. A. I. Order 211-revised, 1922, with amendments. Regulations Governing the Meat Inspection of U. S. Dept. of Agriculture. For horse meat entering into interstate or foreign commerce, mandatory requirements on disallowance of use of animals showing evidence of certain diseases or defects, inspection of meat, labeling meat as "horse meat."

018. MEATS, PREPARED, PRESERVED, CANNED

018.0 GENERAL ITEMS

Institute of American Meat Packers. Standard Packs for Vinegar Pickled Products in Glass Jars; 1931. For pigsfeet, boneless pigsfeet, pig hearts, pig tongues, lamb tongues, honeycomb tripe, etc., standard net weights for product packed in ½ pints, pints, and quarts.

Institute of American Meat Packers. Bulletin No. 17–Z, Nov. 22, 1929. Standard Packs for Vinegar Pickled Products in Tierces, Barrels, and Whitewood Packages. For pickled lamb tongues, pig hearts, honeycomb tripe, pig tongues, and split pigsfeet, standard weights of product in kits, fractional and full size barrels and in tierces.

018.1 BEEF AND VEAL, PREPARED, PRESERVED, CANNED

References.—Pickled beef. *See* 011.95.

018.11 Tongue

U. S. Gov., Federal Specifications Board. 562a; 1928. Canned Beef Tongue. Requirements on general quality and trimming of sweet-pickled tongues, number per can, permissible bone stock, net weight of tongue per can, prepared in accordance with regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—Definitions, methods of analysis, food regulations. *See* 010.

018.12 Corned Beef and Veal

U. S. Gov., Federal Specifications Board. 561a; 1928. Canned Corned Beef. Cut from best quality canner carcasses, requirements on nonpermitted cuts, permissible preservatives, cooking, composition of finished product, permissible salt, nitrate, and nitrite, prepared in accordance with regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—*See* references under 018.11.

018.13 Dried Beef and Veal

Institute of American Meat Packers. Standard Packs for Sliced Dried Beef; 1931. Standard weights of unit packages and standard weights of shipping package.

U. S. Gov., Federal Specifications Board. 563a; 1928. Canned Sliced Dried Beef. Sliced from dried beef hams, requirements on proportions of insides, outsides, and knuckles, prepared in accordance with regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—*See* references under 018.11.

018.14 Luncheon Meat

U. S. Gov., Federal Specifications Board. 569a; 1928. Luncheon Meat. For chilled and frozen classes, requirements on general quality and proportions of mild cured pork and beef trimmings, hashing, permissible water, stuffing, size of pieces, smoking, cooking, prepared according to rules of and under inspection of Dept. of Agriculture, in conformity also with food and drugs act and imported meat act.

References.—*See* references under 018.11.

018.15 Corned Beef Hash

018.16 Veal Loaf

018.17 Spencer Roll

018.18 Roast Beef

018.2 PORK, PREPARED OR PRESERVED

References.—Dry or salt pickled pork. *See* 012.92. Sugar cured and sweet pickle cured pork. *See* 012.93, 012.94. Smoked pork. *See* 012.95.

018.20 General Items

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Standard Packs. For sausage, for 1-pound package, required number to pack in a shipping container.

U. S. Gov., Dept. of Agriculture. Bureau of Animal Industry. B. A. I. Order 211—revised, 1922, with amendments. Regulations Governing the Meat Inspection of U. S. Dept. of Agriculture. For sausage entering into interstate or foreign commerce, mandatory requirements on permissible amount of cereal, vegetable starch, vegetable flour, or added water in sausage. Inclusion of head cheese, liver pudding, and blood pudding under the designation of "sausage."

018.21 Head Cheese

U. S. Gov., Federal Specifications Board. 564a; 1928. Head Cheese. For chilled and frozen classes, requirements on proportions of pork snouts, cheeks, lean pork trimmings, and hogs' rinds, general quality, permissible water, seasoning, stuffing, size of pieces, cooking, permissible age of frozen products, prepared in accordance with regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—Definitions, methods of analysis, food regulations. *See* 010., 018.20. Standard packs. *See* 018.20.

018.22 Sausage, Bologna Style

U. S. Gov., Federal Specifications Board. 575a; 1928. Bologna Style Sausage. For chilled and for frozen classes, requirements on general quality and proportions of beef and pork trimmings, amount of salt and saltpeter added, grinding, stuffing, smoking, cooking, prepared according to regulations of and under supervision of inspectors of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—*See* references under 018.21.

018.23 Sausage, Frankfurter Style

U. S. Gov., Federal Specifications Board. 574b; 1929. Frankfurter Style Sausage. For chilled and for frozen classes, requirements on general quality and proportions of beef and pork trimmings, amount of salt and saltpeter added, grinding, stuffing, smoking, cooking, prepared according to regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—*See* references under 018.21.

018.24 Sausage, Pork

U. S. Gov., Federal Specifications Board. 573a; 1928. Pork Sausage. For chilled and for frozen sausage, requirements on general quality of pork trimmings, permissible water added, seasoning, stuffing, size of links, prepared according to regulations of and under inspection of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—*See* references under 018.21.

018.25 Sausage, Vienna Style

U. S. Gov., Federal Specifications Board. 576b; 1929. Canned Vienna Style Sausage. Requirements on proportions and general quality of beef and pork trimmings, general preparation, amount of salt and of saltpeter added, grinding and stuffing, size of pieces, smoking, made according to the regulations of and under the supervision of inspectors of Dept. of Agriculture, also in conformity with food and drugs act and imported meat act.

References.—*See* references under 018.21.

018.26 Sausage Substitute

018.27 Souse, Pig

018.28 Ham, Cooked

018.3 MUTTON AND LAMB, PREPARED OR PRESERVED

References.—Prepared Mutton Suet for Medical Purposes. *See* 043.1.

018.4 CHICKEN, TURKEY, ETC.

018.5 MINCEMEAT

U. S. Gov.. Federal Specifications Board. PP–M–351; 1931. Mincemeat. For type with low moisture content, type with maximum moisture content of 30 per cent, and for fancy type, requirements on ingredients and amount of each ingredient going into each type, general quality of ingredients and preparation requirements, freedom from artificial coloring, chemical preservatives and foreign matter, to conform to Federal food and drugs act, construction of packing cases.

References.—Definitions, methods of analysis, food regulations. *See* 010.

019. EGGS

019.0 GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Eggs and Egg Products. Method of sampling for liquid eggs, frozen eggs, powdered dried eggs, flaked and drum dried eggs, methods for determination of total solids, organic and ammoniacal nitrogen, water soluble protein-nitrogen, fat, lipoids, lipoid phosphoric acid, unsaponifiable matter, detection of decomposition, acidity of fat, phosphoric pentoxide, chlorine, identification of added color, detection of whole egg or commerciel egg yolk solids, estimation of percentage of egg solids

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 96; 1927. Rules and Regulations of the Sec. of Agriculture Governing the Grading and Certification of Butter, Cheese, and Eggs for Class, Quality, and Condition. Regulations regarding where service is available, designated central markets, who may obtain grading, form of application, certificates.

019.1 FRESH EGGS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Egg Standardization Leaflet No. 2; 1929. Permissive standards, definitions of 7 standard quality grades for individual eggs as regards condition of shell, air cell, yolk, white, and germ; definitions of 4 tentative buying grades for eggs for use of buyers purchasing from producers, includes a weight item in addition to items above for individual eggs; definitions of 22 tentative wholesale grades for eggs for use in wholesale trade, including items on uniformity of size, permissible amount of off-quality eggs in each grade based on standard quality grades for individual eggs.

U. S. Gov., Federal Specifications Board. C–E–271; 1931. Eggs. For fresh, storage, and processed (oil treated) eggs, definitions of 4 retail grades, known as U. S. standards, U. S. extras, U. S. specials, and U. S. specials infertile, requirements on weight of case, general appearance and quality, development of germ, size of air cell, visibility of yolk, etc., quality of oil and processing for processed eggs.

References.—Food regulations. *See* 010. Grading rules for eggs. *See* 019.0.

019.2 FROZEN EGGS

020–029 DAIRY PRODUCTS

021. MILK AND CREAM

021.0 GENERAL ITEMS

American Public Health Assn. and Assn. of Official Agricultural Chemists. Standard Methods of Milk Analysis; 1928. Bacteriological methods of A. P. H. A., including sampling, macroscopic and microscopic counts, methylene blue, sediment tests, etc. Chemical methods of A. O. A. C. for sampling, acidity, solids, ash, nitrogen, casein, albumin, lactose, fat, preservatives, added water, etc.

New England Milk Producers Assn. Price Schedule for Milk; 1928. Included definitions of Class I milk, Class II milk, and cream as regards required percentages of butter fat.

U. S. Gov., Congress. Public, No. 625, 60th Cong.; 1927. Federal Import Milk Act. An act to regulate the importation of milk and cream into the U. S. for the purpose of promoting the dairy industry of the U. S. and protecting the public health. Permissible bacteria in imported milk and cream and pasteurized milk and cream, requirements on health of cows and sanitary condition of dairy.

U. S. Gov., Congress. 34 Stat. 768. June 30, 1906, as amended. (For text see S. R. A., F. D. No. 1, 1930, of Food, Drug, and Insecticide Administration of Dept. of Agriculture.) Federal food and drugs act. An act to prevent the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors, and for regulating traffic therein. Defines conditions which will be considered as adulteration or misbranding for drugs, confectionery, and foods, adopts for drugs the standards of U. S. Pharmacopoeia and Nat. Formulary.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 1. 1930. Regulations for Enforcement of Federal food and drugs act. Act applies to foods and drugs shipped in interstate and foreign commerce, standard methods of analysis to be those of U. S. Pharmacopoeia and Nat. Formulary and of Assn. of Official Agricultural Chemists, regulations regarding the labeling of drugs that do not meet the standards of U. S. Pharmacopoeia and Nat. Formulary, regulations on powders, on poisonous and deleterious ingredients, and on colors and preservatives, ingredients which require a statement on label, etc. Includes text of act as amended.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Milk. Definitions of milk, pasteurized milk, skim milk, goat's milk, and ewe's milk; homogenized, evaporated, sweetened condensed, and dried milks, malted milk, buttermilk, evapporated and condensed skimmed milk; required content of milk fat or milk solids or both for the various treated milks, permissible moisture in dried milks.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A. I. M., No. 1. 1927. Regulations for the enforcement of the Federal import milk act. For the purpose of the act, covers definitions of milk, cream, condensed milk, and evaporated milk, and pasteurization, regulations regarding examination and tuberculin test of cows, sanitary inspection of dairy farms and plants, permits for importation. Includes text of the act.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C19; 1924. Standard Density and Volumetric Tables. Includes tables and specific gravity and weight per gallon of milk and cream, and volume of milk and cream at various temperatures.

U. S. Gov. Treasury Dept. U. S. Public Health Service. The Standard Milk Ordinance and Code; 1929. Recommended for adoption by cities, includes definitions of milk, cream, buttermilk, pasteurization, of 3 grades of raw milk as regards bacterial count, of 1 grade of pasteurized milk, requirements on permits, inspection of dairy farms and plants, testing, labeling, etc.

021.1 FRESH MILK, INCLUDING PASTEURIZED

American Assn. of Medical Milk Commissions, Inc. Methods and Standards for the Production of Certified Milk; 1931. For certified fresh milk, requirements on general quality and bacterial count, methods of test including methods of Am. Public Health Assn., standards relating to veterinary inspection of herds, sanitary inspection of farms and equipment, medical inspection of employees.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Milk. Collection and preparation of sample, determination of solids, ash, total nitrogen, casein, albumin, lactose, fat, amount of added water, presence of gelatin, determination of preservatives, coloring matters, and tentative methods for determination of specific gravity, acidity.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A. I. M., No. 1; 1927. Regulations for the enforcement of the Federal import milk act. Includes a definition of fresh milk for the purpose of the act.

U. S. Gov., Federal Specifications Board. C–M–381; 1931. Fresh milk. Requirements on general quality, pasteurization, content of milk solids and of milk fat, permissible bacteria, methods of test as specified by Assn of Official Agri. Chemists.

References.—Definitions, methods of analysis, food regulations, density tables. *See also* 021.0.

021.2 FRESH CREAM

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Cream Collection and preparation of sample, determination of total solids, ash, total nitrogen, lactose, fat, gelatin, preservatives, coloring matters, and added water.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Cream. Definition of cream, required milk fat, and permissible acid-reacting substances, milk-fat requirement for whipping cream, definition of homogenized cream and of evaporated cream.

U. S. Gov., Federal Specifications Board. C–C–671; 1931. Fresh cream. Requirements on general quality, pasteurization, content of milk fat, permissible bacteria, freedom from added water and preservative for cream, light cream, and whipping cream, methods of test as specified by Assn. of Official Agri. Chemists.

References.—Definitions, methods of analysis, food regulations, density tables. *See* also 021.0.

021.3 BUTTERMILK

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Tentative Definitions. Dried Buttermilk Feed. Definition, permissible content of moisture and of mineral matter (ash), required butterfat content.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Evaporated Buttermilk Feed, Concentrated Buttermilk Feed, Condensed Buttermilk Feed. Definition, requirements on content of total solids, butterfat, and permissible ash.

References.—Definitions, methods of analysis, food regulations, density tables. *See also* 021.0.

021.4 CONCENTRATED MILK

021.5 CONDENSED MILK

Assn. of Official Agricultural Chemists. Official And Tentative Methods of Analysis; 1930. Sweetened Condensed Milk. Preparation of sample, determination of total solids, ash, protein, lactose, fat, sucrose.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A. I. M., No. 1; 1927. Regulations for the enforcement of the Federal import milk act. Includes, for the purpose of the act, definitions of condensed milk and of sweetened condensed milk with requirements on percentages of milk solids and milk fat.

U. S. Gov., Federal Specifications Board. 381a; 1927. Dairy Products. Sweetened Condensed Milk. Requirements on manufacture, general quality, content of milk fat and of total milk solids, methods of test as specified by Assn. of Official Agri. Chemists.

References.—Definitions, methods of analysis, food regulations. *See also* 021.0

021.6 EVAPORATED MILK

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930 Evaporated Milk (Unsweetened). Preparation of sample, determination of total solids, ash, fat, total nitrogen, casein, albumin, lactose, gelatin, preservatives, and coloring matters.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A. I. M., No. 1; 1927. Regulations for the enforcement of the Federal import milk act. Includes, for the purpose of the act, definition of evaporated milk with requirements on percentages of milk fat and total milk solids.

U. S. Gov., Federal Specifications Board. C–M–371; 1931. Unsweetened evaporated milk. Definition, requirements on general quality, content of milk fat and of milk solids, methods of test as specified by Assn. of Official Agri. Chemists.

References.—Definitions, methods of analysis, food regulations. *See also* 021.0.

021.7 MALTED MILK, MILK POWDER

American Dry Milk Institute. Grading of Dry Skim Milk; 1929. For 3 grades of dry skim milk, requirements on flavor, freedom from impurities, percentage fat, moisture, acidity, solubility index, bacterial count, and sediment for spray dried, vacuum dried, and roller dried product, apparatus and methods of testing.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Dried Milk and Malted Milk. Tentative methods for preparation of sample, for determination of moisture, protein, ash, and fat, microscopical identification of malted milk and its flavored products.

U. S. Gov., Federal Specifications Board. C–M–341; 1931. Dry Malted Milk. Requirements on manufacture, content of butter fat and moisture, methods of test as specified by Assn. of Official Agri. Chemists.

U. S. Gov., Federal Specifications Board. C–M–351; 1930. Dry Powdered Milk, Skimmed and Whole. For powdered whole milk, requirements on preparation, bacterial count of pasteurized milk used, content of milk fat and of moisture, color, solubility, acidity and sediment permissible in reconstituted milk. For powdered skimmed milk, requirements on purity, moisture content, freedom from rancidity.

References.—Definitions, methods of analysis, food regulations. *See also* 021.0.

021.8 MILK FAT OR BUTTER FAT

021.9 MISCELLANEOUS SPECIFICATIONS FOR MILK AND CREAM

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Tentative Definitions. Condensed Soured Skimmed Milk (Feeding). Definition, required content of total solids.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Dried Skimmed Milk (Feeding), and Condensed Skimmed Milk (Feeding). Definitions, required content of total solids for condensed milk, permissible moisture for dried milk.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Ice Cream (Plain). Preparation of sample, determination of fat, and of nitrogen, tentative method for detection of coloring matter.

References.—Definitions, methods of analysis, food regulations. *See also* 021.0.

022. BUTTER, CHEESE, AND THEIR SUBSTITUTES

022.0 GENERAL ITEMS

U. S. Gov., Congress. 34 Stat. 768. June 30, 1906, as amended. (For text see S. R. A., F. D. No. 1. 1930 of Food, Drug, and Insecticide Administration of Dept. of Agriculture.) Federal food and drugs act. An act to prevent the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors, and for regulating traffic therein. Defines conditions which will be considered as adulteration or misbranding for drugs, confectionery, and foods, adopts for drugs the standards of U. S. Pharmacopoeia and Nat. Formulary.

U. S. Gov., Congress. 43 Stat. 822, 844–845; 1925. An act making appropriations for the Dept. of Agriculture for the fiscal year ending June 30, 1926. For enabling the Sec. of Agriculture to investigate and certify to shippers and other interested parties the class, quality, and/or condition of cotton, and fruits, vegetables, poultry, butter, hay, when offered for shipment in interstate shipment or received at central markets.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 96; 1927. Rules and Regulations of the Sec. of Agriculture Governing the Grading and Certification of Butter, Cheese, and Eggs for Class, Quality, and Condition. Regulations regarding where service is available, designated central markets, who may obtain grading, form of application, certificates.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 1; 1930. Regulations for enforcement of Federal food and drugs act. Act applies to foods and drugs shipped in interstate or foreign commerce, standard methods of analysis to be those of U. S. Pharmacopoeia and Nat. Formulary, and of Assn. of Official Agricultural Chemists, regulations regarding the labeling of drugs that do not meet the standards of U. S. Pharmacopoeia and Nat. Formulary, regulations on powders, on poisonous and deleterious ingredients, and on colors and preservatives, ingredients which require a statement on label, etc. Includes text of act as amended.

022.1 BUTTER

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Butter. Sampling, determination of moisture, fat, casein, ash, salt, preservatives, coloring matters, microscopic examination.

Pacific States Butter, Egg, Cheese and Poultry Assn. Butter Standards; 1927. Composition and weight to conform to Federal and State requirements, definitions of 4 grades of butter on basis of flavor, body, color, salt, and package, specification for standard butter cube.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A. Markets 51; 1919. The Inspection of Butter under the Food Products Inspection Law. Permissive standards for inspection of butter, grade indicated by numerical score dependent on flavor, body, color, salt, and package, for dairy butter, creamery butter, and process or renovated butter, definitions and maximum scorings for each of above qualities, definitions of 3 grades of ladled butter and 3 grades of packing stock butter, methods of judging butter.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Butter. Definition as fixed by act of Congress of Mar. 4, 1923, required percentage of milk fat.

U. S. Gov., Federal Specifications Board. C–B–801; 1931. Butter. For 2 grades of butter made from cream and for 1 grade made from pasteurized cream, requirements on content of moisture, basis of scoring and required score for flavor, body, color, salt, and package, testing in accordance with methods of Assn. of Official Agri. Chemists.

References.—Food regulations. *See* 022.0. Renovated butter. *See* 022.2.

022.2 RENOVATED BUTTER

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Renovated Butter and Oleomargarine. Tentative tests by foam test and melted fat test for distinguishing from true butter.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A. Markets 51; 1919. The Inspection of Butter under the Food Products Inspection Law. Permissive standards for inspection of butter, grade indicated by numerical score dependent on flavor, body, color, salt, and package for process or renovated butter and other types of butter.

References.—Food regulations. *See* 022.0.

022.3 BUTTER SUBSTITUTE

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Renovated Butter and Oleomargarine. Tentative tests by foam test and melted fat test to distinguish from true butter.

U. S. Gov., Congress. Stat. Public No. 540; 1930. Amendment to Act Defining Butter, Taxing and Regulating Oleomargarine of 1886. Requires that all substances made in imitation of butter, or intended to be sold as butter, or churned or mixed with cream, milk, water, shall be known and designated as "oleomargarine."

U. S. Gov., Federal Specifications Board. EE–0–451; 1930. Oleomargarine. For type A containing animal fats and for type B containing no animal fats, requirements on general quality of product, kinds and amount of ingredients, permissible salt and moisture in type A, permissible fat and moisture in type B, packing requirements.

References.—Food regulations. *See* 022.0.

022.4 CHEESE

022.40 General Items

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Cheese. Selection and preparation of sample, determination of moisture, ash, salt, nitrogen, acidity, fat, and tentative methods for determination of coloring matter, tartaric acid and citric acid.

022.41 Whole Milk Cheese

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Office of Secretary Circular 157; 1923. Handbook for Use in the Inspection of Whole-Milk American Cheese under the Food Products Inspection Law. Permissive standards for cheese in which quality is determined by definition and indicated by a score with maximum ratings set for flavor, body and texture, finish and appearance, and color, definitions of various grades of above qualities with scoring range, regulations stating where cheese may be inspected, who may apply for inspection, form of application, issuing of certificates, and fees.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2, 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Whole Milk or Partly Skimmed Milk Cheese. General definitions and descriptions of edam, emmenthaler, camembert, brie, and parmesan cheeses, required percentages of milk fat in emmenthaler or swiss cheese and in camembert cheeses.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2, 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Whole Milk Cheese. General definitions including required percentage of milk fat and permissible water for cheddar, American, American cheddar, pineapple, limburger, brick, gouda, neufchatel, cream cheeses, general definition and description of stilton, roquefort, and gorgonzola cheeses.

References.—Methods of analysis. *See* 022.40. *See also* American (cheddar) cheese. 022.45.

022.42 Full Cream Cheese

022.43 Edam Cheese

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Edam Cheese. General definition and description.

References.—Methods of analysis. *See* 022.40.

022.44 Camembert Cheese

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Camembert Cheese. General definition, required percentage of milk fat.

References.—Methods of analysis. *See* 022.40.

022.45 American (Cheddar) Cheese

U. S. Gov., Federal Specifications Board. C–C–271; 1931. Cheese. For cheddar, American, or American cheddar cheese, requirements on use of whole milk for manufacture, content of moisture and of butter fat, required scoring based on flavor, texture, and body, color, finish, and appearance, for U. S. Fancy grade and U. S. No. 1 grade, methods of test as specified by Assn. of Official Agri. Chemists.

References.—Methods of analysis. *See* 022.40. *See also* whole milk cheese. 022.41.

022.49 Miscellaneous Specifications for Cheese

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Pasteurized Cheese and Emulsified Cheese. General definitions for each, permissible amount of emulsifying agent for emulsified cheese, permissible water and required milk fat in emulsified cheddar cheese.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Skimmed Milk Cheese. Cottage cheese, or schmierkase, general definition and method of preparation.

References.—Methods of analysis. *See* 022.40.

030–039 FISH

031. FRESH FISH

U. S. Gov., Federal Specifications Board. PP–F–381; 1931. Fresh Fish. For 4 types, fresh, chilled, regular frozen, and quick process frozen, requirements on general quality, requirements on temperature and duration of freezing of the quick freezing process and shipment to destination without other refrigeration.

034. FISH, SALTED OR DRY CURED

U. S. Gov., Federal Specifications Board. PP–F–401; 1931. Salted or Smoked Fish. Specie and size to be specified in order, requirements on general quality, freedom from artificial coloring, preservatives, and impurities, freedom from recognized defects peculiar to the variety.

References.—Definitions, methods of analysis, food regulations. *See* 010.

035. CANNED FISH

035.1 CANNED CODFISH AND HADDOCK

U. S. Gov., Federal Specifications Board. PP–F–371; 1931. Canned Flaked Fish. For codfish, haddock, and codfish and haddock, requirements on general quality, freedom from artificial coloring, adulteration, and impurities, freedom from bones and discoloration, to be corned and flaked, construction of packing boxes.

References.—Definitions, methods of analysis, food regulations. *See* 010.

035.2 CANNED SALMON

U. S. Gov., Federal Specifications Board. PP–S–31; 1931. Canned Salmon. For 5 types, chinook, red, coho, pink and chum, requirements on general quality, freedom from artificial coloring, preservatives, and impurities, softness requirements for bones, color according to type, etc.

References.—*See* references under 035.1.

035.3 CANNED SARDINES

U. S. Gov., Federal Specifications Board. PP–S–51; 1931. Canned Sardines. For type commercially known as quarter oils of either fancy or standard grades, requirements on acceptable methods of preparation, general quality, uniformity of size, freedom from red feed, softness of bones, number per can, filling with vegetable oil, packing box construction.

References.—*See* references under 035.1.

035.4 CANNED FISH FLAKES

References.—Flaked codfish and haddock. *See* 035.1.

035.5 CANNED HERRING

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., Chem. 24. 1920. Item 321. Weights of River Herring Roe in Cans of Various Sizes. Requirements under food and drugs act regarding drained weights of contents for 2 sizes of cans.

References.—*See* references under 035.1.

035.6 CANNED TUNA

U. S. Gov., Federal Specifications Board. PP–T–771; 1931. Tuna Fish, Canned. Requirements on freedom from artificial coloring, preservatives, and impurities, general quality of meat, cooking and separation of light meat, addition of vegetable oils, to conform to Federal food and drugs act.

References.—*See* references under 035.1.

035.7 CANNED MACKEREL

035.8 CANNED ANCHOVIES

036. FRESH SHELLFISH

036.1 OYSTERS

U. S. Gov., Federal Specifications Board. PP–O–956; 1931. Fresh oysters. For commercial grade "selects," requirements on general quality, size, weight, freedom from water and chemical preservatives, permissible bacillus coli as determined by methods of American Public Health Assn.

References.—Definitions, methods of analysis, food regulations. *See* 010.

036.2 CLAMS

U. S. Gov., Federal Specifications Board. PP–C–401; 1931. Fresh clams. For hard shell clams with shells removed, and for soft shell claims, requirements on size, general quality, freedom from added water and chemical preservatives, methods of analysis as specified by Assn. of Official Agricultural Chemists.

References.—*See* references under 036.1.

036.3 CRAB MEAT

U. S. Gov., Federal Specifications Board. PP–C–656; 1931. Fresh crab meat. For meat made from hard shell crabs, lump, flake, and claw types, requirements on general quality, freedom from chemical preservatives, particles of shell, etc., methods of analysis as specified by Assn. of Official Agri. Chemists.

References.—*See* references under 036.1.

036.4 LOBSTERS

037. CANNED SHELLFISH

037.1 CANNED SHRIMP

U. S. Gov., Federal Specifications Board. PP–S–311; 1931. Canned Shrimp. For wet pack and dry pack types, requirements on culling, peeling, washing, freedom from discolored and defective shrimp, use of light brine for wet pack type.

References.—Definitions, methods of analysis, food regulations. *See* 010.

037.2 CANNED CRAB MEAT

U. S. Gov., Federal Specifications Board. PP–C–651; 1931. Crab Meat, Canned. For sound hard shelled crabs cooked alive and canned, requirements on freedom from chemical preservatives, grit, adulterants, and pieces of shell, to be wholesome and sanitary, to conform to Federal food and drugs act, packed in tin cans, with or without shells.

037.3 CANNED LOBSTERS

037.4 CANNED OYSTERS

U. S. Gov., Federal Specifications Board. PP–O–951; 1931. Oysters, Canned. To be of commercial type known as cove, requirements on general quality of oysters and of liquor, to conform to Federal food and drugs act, to be prepared for market under inspection of State or Federal authorities.

039. MISCELLANEOUS FISH PRODUCTS

039.1 CAVIAR

039.2 ANCHOVY PASTE

039.3 CLAM JUICE

039.4 FEEDS OF FISH MEAL

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For crab meal and shrimp meal, tentative definitions when used as feeding stuffs.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Definitions of fish meal and of fish residue meal.

References.—Definitions, methods of analysis. *See* 010.

040–049 ANIMAL AND FISH OILS, FATS, AND GREASES

040. GENERAL ITEMS

American Leather Chemists Assn. Methods of Sampling and Analysis; 1930. Sulfonated (Sulfated) Oils. Official methods for determination of moisture, ash, and unsaponifiable matter, provisional methods for determination of total alkali, combined SO, combined and free fatty acids, free fatty acids, ammonia, sodium sulfate and sodium carbonate in ash, total salts and impurities, neutralized combined SO, sodium as soap, total and neutral fatty matter.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Oils, Fats, and Waxes. Preparation of sample, determination of apparent specific gravity, index of refraction, melting point of fats, titer test, iodine absorption number, saponification number, soluble acids, insoluble acids, free fatty acids, acetyl value, unsaponifiable residue, cottonseed oil, amount of peanut oil and sesame oil, cold test, tentative methods for determination of cholesterol and phytosterol, presence of resin oil, detection of foreign fats containing tristearin in lard, detection of fish oils in presence of vegetable oils, detection of coloring matters.

U. S. Gov., Congress. 34 Stat. 768. June 30, 1906 as amended. (For text see S. R. A., F. D. No. 1. 1930 of Food, Drug, and Insecticide Administration of Dept. of Agriculture.) Federal food and drugs act. An act to prevent the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors, and for regulating traffic therein. Defines conditions which will be considered as adulteration or misbranding for drugs, confectionery, and foods, adopts for drugs the standards of U. S. Pharmacopoeia and Nat. Formulary.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 1; 1930. Regulations for Enforcement of Federal Food and Drugs Act. Act applies to foods and drugs shipped in interstate or foreign commerce, standard methods of analysis to be those of U. S. Pharmacopoeia and Nat. Formulary, and of Assn. of Official Agricultural Chemists, regulations regarding the labeling of drugs that do not meet the standards of U. S. Pharmacopoeia or Nat. Formulary, regulations on powders, on poisonous and deleterious ingredients, and on colors and preservatives, ingredients which require a statement on label, etc. Includes text of act as amended.

041. ANIMAL OILS

041.1 WHALE AND SPERM OIL

041.2 OLEO OIL

041.3 LARD OIL

U.S. Gov., Federal Specifications Board, 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Lard Oil. For lubrication of pipe cutting and threading tools, free from impurities, requirements on specific gravity, water content, pour point, flash point, viscosity, saponification number, amount of free fatty acid and sediment, methods of test.

References.—Methods of analysis, food regulations. *See* 040. Other cutting oils. *See* 504.7.

041.4 NEAT'S-FOOT OIL

042. FISH OILS

042.1 COD OIL

042.2 COD LIVER OIL

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Cod Liver Oil. Description and properties, source, preparation and standard strengths of triturations.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Cod Liver Oil. Physical properties, identity tests, test requirements for purity and for vitamine A potency, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Methods of analysis, food regulations. *See also* 040.

042.3 HERRING AND MENHADEN OIL

043. ANIMAL FATS AND GREASES

043.0 GENERAL ITEMS

American Leather Chemists Assn. Methods of Sampling and Analysis; 1930. Hard Greases. Provisional methods for determination of melting point, titer test, unsaponifiable matter, and free fatty acids.

American Leather Chemists Assn. Methods of Sampling and Analysis; 1930. Moellons. Provisional methods for determination of moisture, ash, unsaponifiable matter, oxidized fatty acids, and free fatty acids.

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Standard Packs. For domestic lard and shortening, standard consumer packages by weight, required number to pack in one shipping container, for 1-pound carton and several sizes of cans.

U. S. Gov., Dept. of Agriculture. Bureau of Animal Industry. B. A. I. Order 211-revised; 1922, with amendments. Regulations Governing the Meat Inspection of U. S. Dept. of Agriculture. For lard, lard substitutes and lard compounds entering into interstate or foreign commerce, mandatory requirements on disallowance of added water.

043.1 TALLOW

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A., 1926. Prepared Suet (Mutton Suet). For medical purposes, physical properties, identity tests, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopœial Convention (Inc.). Pharmacopœia of U. S. A.; 1926. Wool Fat. Physical properties, identity tests, test requirements for purity, for medicinal purposes. Recognized as standard in enforcement of Federal food and drugs act.

References.—Methods of analysis. *See also* 043.0. Food regulations. *See* 040., 043.0.

043.2 LARD

New York Produce Exchange. Rules Regulating Transactions in Lard; 1911. Prime Steam Lard Standard. Requirements on material and method of production of lard, unsalted, and rendered in conformity with the rules and regulations of U. S. Dept. of Agriculture.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Lard. Definition, permissible content of substances other than fatty acids and fat, required freedom from rancidity. Definitions of leaf lard and neutral lard. Used in enforcing food and drugs act.

U. S. Gov., Federal Specifications Board, PP–L–101; 1931. Lard. For refined steam lard and open-kettle-rendered lard, requirements on purity and general quality of lard and on general quality of hog fat used.

U. S. Pharmacopœial Convention (Inc.). Pharmacopœia of U. S. A.; 1926. Lard. For use in preparation of benzoinated lard, physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Methods of analysis, standard pack. *See also* 043.0. Food Regulations. *See* 040., 043.0.

043.3 LARD COMPOUNDS AND LARD SUBSTITUTES

U. S. Gov., Federal Specifications Board. EE–L–101; 1931. Lard Substitutes (Including Vegetable Shortening). For one type derived from vegetable origin only, and for one type containing not more than 80 per cent vegetable oil and not less than 20 per cent of oleo stearin, requirements on general quality of vegetable oil used, freedom of the product from rancidity, foreign odor, and added water.

References.—Methods of analysis, standard pack. *See also* 043.0. Food Regulations. *See* 040., 043.0. Vegetable shortening. *See also* 142.95.

045. STEARINE AND STEARIC ACIDS

U. S. Pharmacopœial Convention (Inc.). Pharmacopœia of U. S. A.; 1926. Stearic Acid. For medical purposes, physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

046. ANIMAL WAXES

American Railway Assn., Telegraph and Telephone Section. 2–G–26; 1927. Beeswax Compound. For use in moisture-proofing ends of textile insulated cables, half beeswax and half paraffin or cerasin, general purity requirements, test requirements for congealing point.

U. S. Pharmacopœial Convention (Inc.). Pharmacopœia of U. S. A.; 1926. Beeswax. For medical purposes, physical properties, identity tests, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

050–059 HIDES AND SKINS (RAW) EXCEPT FURS

051. CATTLE HIDES AND SKINS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative Schedules of Market Classes and Grades of Hides and Skins; 1928. Definitions of veal skins, calf skins, kip skins, steer hide, cow hide, bull hide, stag hide, packer hides, butcher and country hides, weight classification for above classes, definitions of 4 grades in each class as regards color, salt condition, permissible cuts, damaged areas and defects.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative Market Classes and Grades of Kips and Calfskins; 1931. Definitions and weight classification of kips and calfskins, definitions of 4 classes of green salted kips and calfskins as regards quality of salting, definitions of 4 quality grades for each class including permissible holes, cuts, mangy areas, and other defects.

052. HORSE HIDES

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative Schedules of Market Classes and Grades of Hides and Skins; 1928. For renderers and country horse hides, definitions of 4 grades as regards color, salt condition, permissible cuts, damaged areas, and other defects.

053. SHEEP SKINS, RAW

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative Schedules of Market Classes and Grades of Hides and Skins; 1928. Sheep Skins. For pelts, lambs, shearlings, and clips, definitions of 4 quality grades for each of above classes, requirements on color, soundness of grain, salt condition, permissible defects and damaged areas.

060–069 LEATHER AND LEATHER MANUFACTURES

060. GENERAL ITEMS

American Leather Chemists Assn. Methods of Sampling and Analysis; 1930. Chrome Tanned Leathers. Provisional methods of location and size of cuttings and preparation of samples, provisional methods for determination of moisture, total ash, petroleum ether extract, nitrogen, hide substance, chromium, barium, iron, and aluminum, sulphates, and basicity.

American Leather Chemists Assn. Methods of Sampling and Analysis; 1930. Vegetable Tanned Leathers. Provisional methods for location and size of cuttings and preparation of composite sample, official methods for determination of moisture, total ash, insoluble ash, petroleum ether extract, nitrogen, hide substance, water solubles, combined tannin, glucose, provisional methods for determination of magnesium sulphate and mineral acidity.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Leathers, Tentative Methods. Essentially the same as those of Am. Leather Chemists Assn. For vegetable tanned leather, preparation of sample, determination of moisture, total ash, insoluble ash, ether extract, acidity, water-soluble material, glucose, soluble solids, soluble nontannins, soluble tannin, nitrogen, hide substance, combined tannin.

References.—Tanning materials. *See* 231., 809.1.

061. UPPER LEATHER, EXCEPT PATENT

061.1 ELK LEATHER

061.2 GOATSKIN

061.3 HORSEHIDE LEATHER

061.4 KANGAROO LEATHER

061.5 OIL GRAIN LEATHER

061.6 PIGSKIN

061.7 SHEEPSKIN, CHAMOIS SKIN

References.—Sheep skins, raw. *See* 053.

061.8 STEER HIDES

References.—Steer hides, raw. *See* 051.

062. PATENT, ENAMELED, JAPANNED, OR VARNISHED UPPER LEATHER

063. SOLE LEATHER

063.3 SOLE LEATHER, HEMLOCK TANNED

References.—*See* 063.6.

063.6 SOLE LEATHER, OAK AND VEGETABLE TANNED

Tanners Council of America. Standardization Outline of Finders' Sole Leather Bends; 1928. Definitions of 5 quality grades dependent on amount and kind of damage, definitions of 3 grades of weight or substance.

U. S. Gov., Federal Specifications Board. KK–L–261; 1930. Sole Leather, Vegetable Tanned. For sole leather in form of backs, bends, blocks, cut soles, and top lifts, permissible defects and blemishes, requirements on moisture, chemical composition, water absorption, absence of piping and cracking, methods of sampling and testing.

References.—Methods of sampling and analysis. *See also* 060.

064. GLOVE LEATHER

064.1 HORSEHIDE GLOVE LEATHER

065. ROUGH TANNED LEATHER

065.1 COWHIDE

References.—Cowhides, raw. *See* 051.

065.2 HARD RAWHIDE

066. HARNESS, BELTING, AND MISCELLANEOUS LEATHER

066.1 HARNESS LEATHER

066.2 HYDRAULIC LEATHER

U. S. Gov., Federal Specifications Board. 496; 1927. Hydraulic Packing Leather. For 3 grades of butt bends or sides, vegetable tanned, requirements on trim, permissible defects, finish, thickness, cracking, tensile strength and stretch, water absorption, chemical composition, methods of test.

References.—Methods of analysis. *See also* 060.

066.3 LEATHER BELTING

American Petroleum Institute. Standard No. 1; 1931. Belting Specifications. Leather Belting. For oil country purposes, requirements on general quality of oak tanned leather, construction, elongation, tensile strength, cracking test, piping test, and methods of test.

U. S. Gov., Federal Specifications Board 37; 1923. Leather Belting. For single and double ply vegetable tanned belting also for waterproof dressed and waterproof leather belting, requirements on general quality of hides, construction of belts, standard widths and thicknesses and tolerances, tension test, cracking test, bending test, water absorption, quality of waterproof cement, stuffing content, ash, free mineral acid, glucose, with methods of testing, chemical analysis in accordance with methods of Am. Leather Chemists Assn.

References.—Methods of analysis. *See also* 060. Rubber belting. *See* 207.3. Cotton belting. *See* 314.1.

066.4 LEATHER LACING

U. S. Gov., Federal Specifications Board 184; 1924. Lace Leather. For leather in the form of cut laces and whole sides, for alum tanned, indian tanned, or chrome tanned, requirements on finish, dimensions of sides, dimensions and tensile strength of various widths of laces, stretch, crackiness, degree of chrome tannage, chemical requirements, and methods of test.

References.—Methods of analysis. *See also* 060.

066.5 LEATHER PACKING

References.—Packing leather. *See* 066.2.

066.6 STRAP LEATHER

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS34–31; 1931. Bag, Case, and Strap Leather. A commercial standard selected and accepted by industry establishing standard thicknesses and tolerances for leathers used in traveling bags and straps, using Woburn standard gage for measuring.

066.7 UPHOLSTERY AND ARTIFICIAL LEATHER

Society of Automotive Engineers; 1931. Handbook. Recommended Practice. Upholstery Leather; 1926. Covers full-grain (snuffed), machine-buffed, and No. 1 split upholstery leather. Requirements on appearance of vertical section, number of patches allowed, submission of sample hides as standards, thickness, appearance, doubling and creasing test, tearing test and strength.

Tanners' Council of America. Upholstery Leather; 1931. Definitions of top grains, hand buffs, machine buffs, special machine buffs, deep buff, and splits, permissible defects in No. 1 selection and No. 2 selection, recommended tensile strengths for the various grades.

U. S. Gov., Federal Specifications Board. 183; 1924. Upholstery Leather. For grain (snuffed), machine buffed, and No. 1 split grades of dyed and coated upholstery leather, vegetable tanned, permissible defects for 2 grades, requirements on area of hide, thickness, crackiness, tensile strength, stretch, fiber appearance, tackiness, chemical constituents, methods of test.

References.—Methods of analysis. *See also* 060. Cellulose acetate and cellulose nitrate products. *See* 846.5.

066.8 RIGGING LEATHER

U. S. Gov., Federal Specifications Board. 483a; 1929. Rigging Leather. For backs or sides of 3 thickness grades, permissible defects, requirements on thickness, cracking, tensile strength and stretch, and chemical composition, methods of sampling and test.

References.—Methods of analysis. *See also* 060.

066.9 MISCELLANEOUS SPECIFICATIONS FOR HARNESS, BELTING, AND OTHER LEATHERS

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS34–31; 1931. Bag, Case, and Strap Leather. A commercial standard selected and accepted by industry establishing standard thicknesses and tolerances for leathers used in traveling bags, brief cases, suitcases, pocketbooks, and straps, using Woburn standard gage for measuring.

U. S. Gov., Federal Specifications Board. 482; 1927. Bag Leather. For letter carrier's satchels and special delivery bags for Post Office and for cases and bags for War Dept., of first cut from hide, vegetable tanned, permissible defects for 2 grades of sides, requirements on area of side, thickness, tensile strength and stretch, fibre appearance, color, finish, and chemical composition, methods of test.

References.—Methods of analysis. *See also* 060.

067. LEATHER FOOTWEAR

067.1 SHOES

References.—Elastic shoe goring. *See* 394.5.

067.2 BOOTS

References.—Rubber boots. *See* 203.11.

067.3 SLIPPERS

067.4 MOCCASINS

067.5 MUCKLUCKS

067.6 HALF SOLES OR TAPS, INSOLES, OUTSOLES, SLIPSOLES

References.—Sole leather in form of cut soles, backs, bends, and blocks. *See* 063.6.

067.7 SHOE PACS AND COUNTERS

067.8 SPECIAL SHOES, ATHLETIC, ETC.

068. LEATHER GLOVES

068.1 ATHLETIC GLOVES AND MITTENS

National Collegiate Athletic Assn. College Baseball Rules; 1930. (Publ. No. 130R of American Sports Publ. Co., 45 Rose St., N. Y.). Gloves. Standards as given are the same as those of National League and American League of Professional Base Ball Clubs.

National League of Professional Base Ball Clubs. American League of Professional Base Ball Clubs. National Assn. of Professional Base Ball Leagues. Official Base Ball Rules; 1930. (Publ. No. 100X of American Sports Publ. Co., 45 Rose St., N. Y.). Gloves. For gloves, except catchers and first baseman's, permissible maximum weight and palm size.

068.2 LEATHER WORK GLOVES

068.3 DRESS GLOVES

068.4 RIDING GLOVES

068.5 HAND LEATHERS

068.6 MITTENS, LEATHER

068.7 GAUNTLETS

069. MISCELLANEOUS MANUFACTURES OF LEATHER

069.1 ATHLETIC GOODS OF LEATHER

American Physical Education Assn., National Section on Women's Athletics. Women's Official Basket Ball Rules; 1930. (Publ. No. 17R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Ball. To consist of rubber bladder with round leather case, required circumference and weight, tolerances.

Amateur Athletic Union of the U. S. Official Athletic Rules; 1931. Publ. No. 117R of American Sports Publishing Co., 45 Rose St., New York, N. Y. Volley Ball. For rubber bladder ball covered with leather case, requirements on circumference and weight limits.

Amateur Athletic Union of the U. S. Official Athletic Rules; 1931. Publ. No. 117R of American Sports Publishing Co., 45 Rose St., New York, N. Y. Water Polo Ball. For inflated leather covered ball, requirements on circumference, waterproofness, absence of grease and strapped seams.

American Physical Education Assn., National Section on Women's Athletics. Official Soccer Rules for Women; 1930. (Publ. No. 116R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Ball. For inflated ball, required rubber bladder, leather casing, standard circumference and tolerance.

American Physical Education Assn., National Section on Women's Athletics. Volley Ball Rules for Girls and Women; 1930. (Publ. No. 115R of American Sports Publ. Co., 45 Rose St., N. Y.) Volley Ball. For round ball with rubber bladder and leather case, requirements on circumference, weight, and inflation pressure.

Joint Basketball Rules Committee representing Y. M. C. A., Amateur Athletic Union, and Nat. Collegiate Athletic Assn. Official Basketball Rules; 1931–32. (Publ. No. 700X of Am. Sports Publ. Co., 45 Rose St., N. Y.) Ball. To consist of rubber bladder and leather cover, requirements on circumference and weight, tolerances.

National Collegiate Athletic Assn. Official Foot Ball Rules; 1930. (Publ. No. 5R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Ball. To be of leather with rubber bladder, requirements on inflation pressure, shape, circumference on long and on short axis, length of long axis, weight of ball, tolerances.

National Collegiate Athletic Assn. Rules of International or Soccer Water Polo. (Publ. No. 91R of American Sports Publ. Co., 45 Rose St., N. Y.) Ball. For leather covered inflated ball, standard circumference and tolerance, requirements on waterproofness and freedom from grease.

National Collegiate Athletic Assn. and Intercollegiate Soccer Football Assn. of America. Laws of Game of Soccer; 1930. (Publ. No. 108R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Ball. Outer casing to be of leather, required circumference and weight of round ball, tolerances.

References.—Baseball gloves. *See* 068.1.

069.2 HARNESS AND SADDLERY

References.—Saddlers' nails. *See* 608.11. Saddlers' tacks. *See* 608.14.

069.3 CLOTHING BELTS, SAFETY BELTS, ETC.

American Railway Assn., Telegraph and Telephone Section. 1–A–18; 1927. Belts and Safety Straps. For lineman's leather body belt and safety strap, required dimensions and design of belt, strap, and snap hook, construction requirements, tensile test requirements of fittings and of belt and strap, flexibility test of belt and strap.

National Electric Light Assn. Suggested Specifications. Publ. 24–51; 1924. Lineman's Leather Belts. General quality requirements for leather, snaps of forged steel, design, dimensions, and construction requirements, for body belt and for safety belt, tension test requirements for finished belt.

Underwriters' Laboratories (Inc.) Window Cleaners' Belts and Anchors; 1930. Requirements on chemical composition of brass, monel metal, or copper-nickel forgings for belt hardware and for anchors, permissible size and type of rope where rope is used, tension tests of waist band and ropes of belt, pull test on anchor, method of installation of anchors on frame and metal windows.

References.—Cotton belts. *See also* 311.8.

069.4 LEATHER CLOTHING

069.5 LEATHER STRAPS

References.—Lineman's safety straps. *See* 069.3.

069.6 BELLOWS LEATHER

069.7 LEATHER CASES

069.9 MISCELLANEOUS SPECIFICATIONS FOR LEATHER MANUFACTURES

References.—Sandblasting helmets, protective shields and goggles of leather. *See* 914.5.

070–079 FURS

071. UNDRESSED FURS

073. FURS DRESSED ON THE SKIN

075. MANUFACTURES OF FUR AND FUR SKINS

075.1 PARKA

075.2 FUR ROBES

075.3 FUR MITTENS

075.4 FUR CAPS

090–099 MISCELLANEOUS ANIMAL PRODUCTS

091. BONES, HOOFS, AND HORNS

092. FEATHERS AND MANUFACTURES

092.1 FEATHERS

092.2 FEATHER DUSTERS

092.9 MISCELLANEOUS MANUFACTURES OF FEATHERS

References.—Feather pillows. *See* 315.33.

093. GLUE STOCK, GLUE, AND GELATIN

093.0 GENERAL ITEMS

National Assn. of Glue Manufacturers. Journal of Industrial and Engineering Chemistry. July 15, 1930. Methods for Determining Viscosity and Jelly Strength of Glue; 1930. Standard method for sampling and preparation of sample, description of apparatus, test procedure.

093.1 GLUE STOCK, INCLUDING HIDE CUTTINGS, ETC.

093.2 CASEIN GLUE

093.3 FLAKE GLUE

U. S. Gov., Federal Specifications Board. C–G–451; 1931. Animal Glue for Woodworking. For 6 grades in flake, ground, or other form, requirements on moisture content, jelly strength, viscosity, neutrality, tendency to foam, odor and keeping qualities, methods of test for each of above qualities, includes grades for use in veneering, grades for edge joints in furniture, and grades for warm humid climates.

References.—Methods of testing. *See also* 093.0.

093.4 HIDE GLUE

093.5 PATTERN MAKERS' GLUE

093.6 LIQUID GLUE

093.7 GELATIN

American Chemical Society. Journal of Industrial and Engineering Chemistry; Jan. 15, 1929. Committee Recommendation. Tentative Specifications for Standard Gelatin. For standard gelatin for physicochemical purposes, of calfskin source, requirements on preparation, ash content, qualities, content of heat coagulable protein, etc.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Gelatin. Tentative methods for preparation of sample, determination of moisture, ash, total phosphorus, nitrogen, arsenic, copper, zinc, polariscope constants, sulphur dioxide.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 50, Gelatine Sizing. List of required materials and amounts of each, methods of preparation.

U. S. Gov., Federal Specifications Board. C–G–191; 1931. Gelatin. For plain gelatin and for dessert powder, requirements on general quality, freedon from odor, fineness of grinding, jelly forming qualities.

U. S. Pharmacopœial Convention (Inc.), Pharmacopœia of U. S. A.; 1926. Gelatin. Physical properties, identity tests, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Methods of testing glue. *See also* 093.0.

093.9 MISCELLANEOUS SPECIFICATIONS FOR GLUE, ETC.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 52, Rug Sizing (animal glue). List of required materials and amounts of each, methods of preparation.

U. S. Gov., Interstate Commerce Commission Regulations for Transportation by Rail of Dangerous Articles; 1930. Shipping Container Spec. 10A. Wooden Barrels and Kegs (Tight). For glue used as a lining material for barrels, requirements on grade according to Peter Cooper's standards, freedom from foam, permissible time for becoming rancid, mandatory for glue used with shipments of dangerous articles.

References.—Methods of testing glue. *See also* 093.0.

094. SAUSAGE CASINGS

095. IVORY

096. SHELLS

097. SPONGES

098. ANIMAL PRODUCTS, UNMANUFACTURED, NOT ELSEWHERE CLASSIFIED

098.1 MEAT MEAL, MEAT SCRAPS, BONE MEAL, BLOOD MEAL

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Crab Meal. Definition, required content of protein.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Shrimp Meal. Definition.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For animal byproducts, definitions of blood meal, blood flour, digester tankage, and meat scraps, raw bone meal, steamed bone meal and special steamed bone meal.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Definitions of fish meal and of fish residue meal.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1924. Feeding Stuffs. Bone in Meat Scrap or Tankage. Tentative method of determination.

References.—Bone, hoof and horn meal, fish scrap, dried blood, fish scales, as fertilizers. *See* 850. and 859.

099. MANUFACTURED ANIMAL PRODUCTS NOT ELSEWHERE CLASSIFIED

099.1 BOUILLON CUBES AND BEEF EXTRACT

Assn. of Official Agricultural Chemists. Official and tentative Methods of Analysis; 1930. Meat Extracts and Similar Products. Preparation of sample, determination of moisture, ash, total phosphorus, chlorides, total nitrogen, creatin, creatinin, preservatives, tentative methods for determination of insoluble and of coagulable nitrogen, proteoses and gelatin, gelatin, amino nitrogen, nitrates, glycerol, sugar, metals.

099.2 WOOL AND HAIR AND MANUFACTURES

References.—Wool and woolen products. *See* 360–369.

099.3 SILK AND MANUFACTURES THEREOF

References.—Silk and silk products. *See* 370–379.

100-199 VEGETABLE FOOD PRODUCTS

100-109 GRAINS AND PREPARATIONS

100. GENERAL ITEMS

American Institute of Baking. Standards and Definitions of Food and Materials. Bulletin No. 3; 1921. Definitions and standards promulgated by Dept. of Agriculture for materials used by the baker.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Plants. Methods for determination of sand and silica, calcium, magnesium, manganese, sodium and potassium, copper, zinc, sulphur, phosphorus, chlorine, total nitrogen, and tentative methods for moisture, ash, iron, aluminum, arsenic, sugars, sucrose, starch, ether extract, and crude fiber.

U. S. Gov., Congress. 34 Stat. 768. June 30, 1906, as amended. (For text see S. R. A., F. D. No. 1. 1930 of Food, Drug, and Insecticide Administration of Dept. of Agriculture.) Federal Food and Drugs Act. An act to prevent the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors, and for regulating traffic therein. Defines conditions which will be considered as adulteration or misbranding for drugs, confectionery, and foods, adopts for drugs the standards of U. S. Pharmacopoeia and Nat. Formulary.

U. S. Gov., Congress. 39 U. S. Statutes at Large, p. 482. U. S. Grain Standards Act of Aug. 11, 1916. Gives authority to the Secretary of Agriculture to fix and establish standards for grains and requires the use of these standard grades in the shipment in interstate or foreign trade of grain sold by grade.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Dept. Bull. No. 1375; 1927. The Brown-Duvel Moisture Tester and How to Operate It. Specified as the official method for determining the moisture content of grains for which official standards have been established. Construction specifications, how to make a moisture test, standardizing the moisture tester, drawing and handling samples, etc.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 1; 1930. Regulations for Enforcement of Federal Food and Drugs Act. Act applies to foods and drugs shipped in interstate or foreign commerce, standard methods of analysis to be those of U. S. Pharmacopoeia and Nat. Formulary, and of Assn. of Official Agricultural Chemists, regulations regarding the labeling of drugs that do not meet the standards of U. S. Pharmacopoeia or Nat. Formulary, regulations on powdering, on poisonous and deleterious ingredients, and on colors and preservatives, ingredients which require a statement on label, etc. Includes text of act as amended.

U. S. Gov., Dept. of Agriculture. Office of Secretary—Circular 70; 1920. Regulations of the Secretary of Agriculture under U. S. Grain Standards Act of 1916. Rules relating to licensing of inspectors, duties of inspector, form of inspection certificates, appeals, disputes, etc. Includes a copy of U. S. grain standards act.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Corn, oats, wheat, barley, feed oats, mixed feed oats, rye, and grain sorghums shall conform to one of the U. S. Grades of the U. S. Dept. of Agriculture.

101. BARLEY AND BARLEY PREPARATIONS

101.1 BARLEY

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. G. S. A.—G. I.—Form 90; 1929. Handbook of Official Grain Standards. Barley Standards. For 5 classes of barley, as barley, western barley (2 subclasses), two-rowed barley (2 subclasses), black barley, and mixed barley, definitions of each class and subclass, mandatory requirements on appearance, test weight, percentage of sound barley, permissible damaged grain, oats, foreign material, and other classes of barley for 6 to 9 grades of each class and subclass, definitions of sample grade, definitions and grading rules for mixed, bleached, garlicky, weevily, and smutty barley, test methods.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C10; 1924. Legal Weights per Bushel of Various Commodities. For barley, weight of a bushel as defined by Federal statutes, also the bushel weight as established by various States.

U. S. Gov., Federal Specification Board, N–B–121; 1931. Pearl Barley. For No. 2 or No. 3 " Pearl " barley, requirements on general quality, in conformity with Federal food and drugs act and decisions, analyses in accordance with methods of Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food regulations. *See* 100.

101.2 BARLEY FLOUR

101.9 MISCELLANEOUS SPECIFICATIONS FOR BARLEY

References.—Barley products as feeding stuffs. *See* 119.9.

102. BUCKWHEAT AND FLAXSEED

102.1 BUCKWHEAT GRAIN

New York Produce Exchange. Buckwheat Standards; 1927. Requirements on percentage of buckwheat of two acceptable varieties, for 4 grades requirements as to coolness, maturity, soundness, and cleanliness, for tough and damp grades requirements on permissible moisture.

References.—Methods of analysis, food regulations. *See* 100. Buckwheat mill feed products. *See* 118.9.

102.2 BUCKWHEAT FLOUR

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Buckwheat Flour. Definition, required percentage of nitrogen, permissible percentages of moisture and ash.

U. S. Gov., Federal Specifications Board. N–F–451; 1931. Buckwheat Flour. Requirements on general quality, permissible moisture and ash, required nitrogen, in conformity with Federal food and drugs act and decisions, analyses according to methods of Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food regulations. *See* 100.

102.3 FLAXSEED GRAIN

U. S. Gov., Dept. of Commerce. Bureau of Standards. C10; 1924. Legal Weight per Bushel of Various Commodities. For flaxseed (linseed), weight of a bushel as defined by Federal statutes, also the weight established by various States.

References.—Flaxseed oil cake and meal. *See* 112.1.

103. CORN AND GRAIN SORGHUMS AND PREPARATIONS

103.0 GENERAL ITEMS

American Assn. of Cereal Chemists. Methods for the Analysis of Cereals and Cereal Products; 1928. Alcoholic Acidity of Corn. Standard method for determination of.

103.1 CORN

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. G. S. A.–G. I.–Form 90; 1929. Handbook of Official Grain Standards. Shelled Corn Standards. For 3 classes, white, yellow, and mixed corn, definitions of each class, mandatory requirements on minimum test weight, permissible moisture, foreign material, and damaged corn, definition of sample grade, definition of weevily corn and method of grading, test methods.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C10; 1924. Legal Weights per Bushel of Various Commodities. For corn, cracked or shelled, weight of a bushel as defined by Federal statutes, also the weight established by various States.

References.—Methods of analysis, food regulations. *See* 100, 103.0.

103.2 CORN FLOUR

103.3 STARCH

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 44. To Prepare Corn Starch for Lace Curtains. Requirements on mixing corn starch with water, proportions of each, heating.

U. S. Gov., Federal Specifications Board. N–C–541; 1931. Corn starch. Requirements on general quality and permissible moisture in conformity with Federal food and drugs act and decisions, analyses in accordance with methods of Assn. of Official Agricultural Chemists, construction of packing boxes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Starch. For medicinal purposes, description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Methods of analysis, food regulations. *See also* 100.

103.4 CORN MEAL, CORN GLUTEN FEED AND MEAL

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Tentative Definitions. Corn Meal (Feeding), Corn Feed Meal. Definitions of each.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For corn products, definitions of ear corn chops, corn meal, corn bran, gluten feed, hominy feed, corn oil cake, etc.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Corn feed meal, corn gluten feed. Requirements on general quality, conforming to definition given by Assn. of Am. Feed Control Officials.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Maize Meal. Definition of maize or corn meal, required percentage of nitrogen, permissible moisture and ash.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Corn gluten meal. Requirements on general quality, conforming to definition given by Assn. of American Feed Control Officials.

U. S. Gov., Federal Specifications Board. N–C–521; 1931. Cornmeal (White or Yellow). Requirements on general quality, permissible moisture and ash, required nitrogen, in conformity with Federal food and drugs act, analyses in accordance with methods of Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food regulations. *See* 100, 103.0. Corn oil cake, corn oil meal, corn germ cake, corn germ meal. *See* 112.9.

103.5 GRAIN SORGHUMS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. G. S. A.–G. I.—Form 90; 1929. Handbook of Official Grain Standards. Grain Sorghums Standards. For 9 classes, as kafir (2 subclasses), milo (2 subclasses), durra (2 subclasses), feterita, darso, freed sorgo, brown kaoliang, shrock kafir, and shallu, definitions of class and subclass, mandatory requirements on condition and appearance, test weight, permissible moisture, damaged kernels, other grains, and foreign material, for 4 grades of each class and subclass, definition of sample grade, definitions and grading rules for mixed, weevily, and smutty grain sorghums, test methods.

References.—Methods of analysis, food regulations. *See* 100.

103.9 MISCELLANEOUS SPECIFICATIONS FOR CORN

References.—Corn chops and grits. *See also* 119.2. Table corn, canned corn. *See* 122.2, 126.2.

104. OATS AND OAT PRODUCTS

104.0 GENERAL ITEMS

American Assn. of Cereal Chemists. Methods for the Analysis of Cereals and Cereal Products; 1928. Tests for Stain in Oats. Standard procedure.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Grain and

Stock Feeds. Oat Hulls in Oats and Oat Feeds. Tentative methods for determination.

104.1 OATS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. G. S. A.–G. I.–Form 90; 1929. Handbook of Official Grain Standards. Feed Oats Standards. Definitions of feed oats and of bleached feed oats, mandatory requirements on general appearance, test weight, percentage cultivated oats, permissible damaged grain and foreign material, for 3 grades, definition of sample grade, test methods.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. G. S. A.–G. I.–Form 90; 1929. Handbook of Official Grain Standards. Mixed Feed Oats Standards. For mixed cultivated and wild oats, definitions of mixed feed oats, bleached mixed feed oats, and weevily mixed feed oats, mandatory requirements on appearance, test weight, permissible damaged grain and foreign material for 3 grades, definitions of sample grade, test methods.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. G. S. A.–G. I.–Form 90; 1929. Handbook of Official Grain Standards. Oats Standards. Mandatory requirements on color and grade classification, definitions of 4 grades as regards coolness, stain, test weight, percentage of sound oats, permissible damaged grain, foreign material, wild oats, and other colors, definitions of sample grade, definitions of bleached oats, weevily oats, and cereal oats and methods of grading, test methods.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C10; 1924. Legal Weight per Bushel of Various Commodities. For oats, weight of a bushel as defined by Federal statutes, also the weight established by various States.

References.—Methods of analysis and tests, food regulations. *See* 104.0, 100.

104.2 OAT FLOUR

References.—Methods of analysis, food regulations. *See* 100. Other specifications for oatmeal and rolled oats. *See* 109.4.

104.9 MISCELLANEOUS SPECIFICATIONS FOR OATS

References.—Oats products as mill feeds. *See* 118.9. Oatmeal and rolled oats. *See* 109.4.

105. RICE AND RICE PRODUCTS

105.1 RICE

Rice Millers Assn. Milled Rice, Brown Rice, and Rough Rice. This Assn. has adopted the official standards of the U. S. Dept. of Agriculture.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. G. S. A.–G. I. Form No. 179; 1928. Handbook of Official Standards for Milled Rice, Brown Rice, and Rough Rice. Permissive standards, for brown rice and for rough rice, definitions for 8 classes, such as honduras, edith, etc., definitions of 3 grades of brown rice and of 5 grades of rough rice as regards permissible cereal grains, seed, mud, damaged and broken kernels, per cent of moisture, definitions of sample and weevily grades, sampling and test methods.

U. S. Gov., Federal Specifications Board. N–R–351; 1931. Rice. Includes the classes short grain, long grain, and round grain, with types acceptable under each class, for the grades U. S. No. 1 uncoated and U. S. No. 2 uncoated, definitions of grades in conformity with definitions of the U. S. Dept. of Agriculture given in Handbook of Official Standards for Milled Rice, Brown Rice, and Rough Rice.

References.—Methods of analysis, food regulations. *See* 100. Rice feeding stuffs. *See* 119.5.

106. RYE AND RYE PREPARATIONS

106.1 RYE

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. G. S. A.—G. I.—Form 90; 1929. Handbook of Official Grain Standards. Rye Standards. Definition of rye, mandatory requirements on test weight, permissible moisture, damaged kernels, and foreign material, for 4 grades, definition of sample grade, definitions and grading rules for garlicky, weevily, ergoty, and smutty rye, test methods.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C10; 1924. Legal Weight per Bushel of Various Commodities. For rye, weight of a bushel as defined by Federal statutes, also the weight as established by various States.

References.—Methods of analysis, food regulations. *See* 100.

106.2 RYE FLOUR

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Rye Flour. Definition, required percentage of nitrogen, permissible percentages of moisture and ash.

References.—Methods of analysis, food regulations. *See* 100.

106.9 MISCELLANEOUS SPECIFICATIONS FOR RYE

References.—Rye products as mill feeds. *See* 118.9.

107. WHEAT AND PREPARATIONS FROM WHEAT

107.0 GENERAL ITEMS

American Assn. of Cereal Chemists. Methods for the Analysis of Cereals and Cereal Products; 1928. Determination of Smutty Wheat, Methods for Detecting Sulphur Bleached Grain. Standard procedure for determination.

American Assn. of Cereal Chemists. Methods for the Analysis of Cereals and Cereal Products; 1928. Enzymic Determinations. Requirements for determination of catalase activity, diastatic value of flour, proteolytic activity of wheat and flour.

107.1 WHEAT

American Assn. of Cereal Chemists. Methods for the Analysis of Cereals and Cereal Products; 1928. Wheat. Requirements on sampling and methods for determination of moisture, ash, acidity, protein, amino acids, water soluble nitrogen, distribution of nitrogen, starch, sugars, sucrose, crude fat, crude fibre, carbohydrates, and nitrogen-free extract.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. G. S. A.—G. I.—Form 90; 1929. Handbook of Official Grain Standards. For hard red spring wheat, durum wheat, hard red winter wheat, soft red winter wheat, and white wheat, definitions of 2 and 3 classes under each of above varieties as regards percentages of certain type kernels, mandatory requirements on minimum test weight, permissible moisture, damaged kernels, foreign material, and other wheat varieties, for 5 grades of each class, definitions of sample grade, test methods.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. G. S. A.—G. I.—Form 90; 1929. Handbook of Official Grain Standards. Includes mandatory grades for mixed wheat, mixed durum, treated, garlicky, smutty, and weevily wheat, definitions of each of above types and method of grading and designating grade, test methods.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C10; 1924. Legal Weight per Bushel of Various Commodities. For wheat, weight of a bushel as defined by Federal statutes, also the weight as established by various States.

References.—Methods of analysis, food regulations. *See also* 107.0, 100. Wheat and wheat products as feeding stuff. *See also* 118.1, 118.2, 118.3. Flour. *See* 107.2, 107.3, 107.4.

107.2 GLUTEN FLOUR

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 1; 1928. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Gluten Flour and Ground Gluten. Definitions, required percentage of nitrogen, permissible percentages of moisture, nitrogen-free extract, and starch for each.

References.—Methods of analysis, food regulations. *See* 107.0, 107.3, 100.

107.3 WHEAT FLOUR

American Assn. of Cereal Chemists. Methods for the Analysis of Cereals and Cereal Products; 1928. Wheat Flour. Requirements on sampling, on determination of moisture, ash, acidity, buffer value, protein, glutenin, water soluble nitrogen, amino nitrogen, gluten quality, cold water extract, starch, sugars, crude fat, crude fiber, gasoline color value, pekar color test, bacteria, nitrite nitrogen, qualitative and quantitative test of chlorine bleached flour.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Wheat Flour. Determination of moisture, ash, fat,, ether extract, crude fiber, protein, hydrogen ion concentration, lipoids, and tentative methods for determination of acidity of water extract, sugars, alcohol soluble proteins, albumin and amino nitrogen, gluten, chlorine, nitrite nitrogen, gasoline color value, starch.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Flour, White Flour, Wheat Flour. Definition, required percentage of nitrogen, permissible percentages of moisture, ash, and fiber.

U. S. Gov., Federal Specifications Board. N–F–481; 1931. Wheat Flour. For hard wheat flour, blended flour, and soft wheat flour, requirements on general quality of wheat and of flour, permissible moisture and ash, required protein, and for the hard wheat flour required absorption, in conformity with Federal food and drugs act, analyses in accordance with methods of Assn. of Official Agricultural Chemists.

References.—Gluten flour. *See also* 107.2. Whole wheat flour. *See also* 107.4. Methods of analysis, food regulations. *See also* 107.0, 100. Purified middlings, semolina, and farina. *See* 109.7. Flour mill feeds. *See* 118.3.

107.4 WHOLE WHEAT (GRAHAM) FLOUR

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Whole wheat Flour, Graham Flour. Definition, used in enforcing Federal food and drugs act.

U. S. Gov., Federal Specifications Board. N–F–461; 1931. Graham Flour (Whole Wheat Meal). Requirements on general quality of wheat used as source, permissible moisture, ash, and crude fiber, required protein, in conformity with Federal food and drugs act and decisions, analyses in accordance with methods of Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food regulations. *See* 100, 107.0, 107.3.

107.5 PASTRY FLOUR

108. BREAD AND BAKING PRODUCTS

108.0 GENERAL ITEMS

American Assn. of Cereal Chemists. Methods for the Analysis of Cereals and Cereal Products; 1928. Alimentary Pastes. Requirements on preparation of sample, on determination of moisture, ash, chlorides in ash, organic and ammoniacal nitrogen, water soluble protein, fat, lipoids and lipoid phosphoric acid.

American Assn. of Cereal Chemists. Methods for the Analysis of Cereals and Cereal Products; 1928. Bread. Requirements for preparation of sample, determination of moisture, ash, acidity, crude protein, crude fat, and sugars.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Alimentary Pastes. Methods for preparation of sample, determination of moisture, ash, chlorides in ash, water-soluble protein nitrogen, fat, lipoids, identification of added color, of whole egg or commercial yolk solids, determination of egg solids.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Bread. Methods for determination of total solids, ash, protein, crude fiber and fat, tentative baking test.

108.1 BREAD AND ROLLS

American Institute of Baking. Bread Score Report. Undated. An itemized sheet for scoring loaf bread with standard scores for volume, color of crust, symmetry, evenness of bake, break and shred, character of crust, grain, color of crumb, texture, flavor, and taste.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Boston Brown Bread. Definition, ingredients and usual leavening agents, used in enforcing the Federal food and drugs act.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Raisin Bread. Definition, permissible content of edible farinaceous substances in the flour ingredient, required content of raisins, used in enforcing Federal food and drugs act.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. White Bread. Definition, permissible content of edible farinaceous substance in the flour ingredient, permissible moisture, used in enforcing Federal food and drugs act.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Whole Wheat Bread, Graham Bread. Definition including permissible amount of moisture, used in enforcing Federal food and drugs act.

U. S. Gov., Federal Specifications Board. EE–B–671; 1931. Bread and Rolls. For white wheat bread, pan style, for wheat bread, Vienna style, for graham bread, for rye bread, and for rolls, white or graham, requirements on purity and freshness of ingredients, general quality of product, proportions of white flour in graham bread and of rye flour in rye bread to conform to local commercial practice, product to conform to Federal food and drugs act.

References.—Methods of analysis, food regulations. *See* 108.0, 100. Flour. *See* 107.3.

108.2 CAKES

108.3 CRACKERS

U. S. Gov., Federal Specifications Board. EE–C–651; 1931. Soda Crackers. For salted or unsalted variety, requirements on use of sound flour free from smut, freedom from rancidity, staleness, or foreign odor, to be crisp and of good flavor, to conform to Federal food and drugs act.

References.—*See* references under 108.1.

108.4 MACARONI, NOODLES, SPAGHETTI, AND VERMICELLI

108.41 Macaroni

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Macaroni. Definitions of macaroni and of semolina macaroni, kinds of materials used in making, permissible percentage of moisture.

U. S. Gov., Federal Specifications Board. 648a; 1929. Spaghetti, Macaroni, and Vermicelli. For solid or tubular stem, in conformity with Federal food and drugs act and subsequent decisions, of American manufacture, requirements on approximate dimensions, percentage of protein, permissible moisture, analysis in accordance with methods of Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food regulations. *See* 108.0, 100. Flour. *See* 107.3.

108.42 Noodles

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Noodles. Definitions of egg noodles and of water noodles, egg content requirements for egg noodles, permissible percentage of moisture.

References.—*See* references under 108.41.

108.43 Spaghetti

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Spaghetti. Definitions of spaghetti and of semolina spaghetti, kinds of materials used in making, permissible moisture content.

U. S. Gov., Federal Specifications Board. 648a; 1929. Spaghetti, Macaroni, and Vermicelli. For solid or tubular stem, in conformity with Federal food and drugs act and subsequent decisions, of American manufacture, requirements on approximate dimensions, percentage of protein, permissible moisture, analysis in accordance with methods of Assn. of Official Agricultural Chemists.

References.—*See* references under 108.41.

108.44 Vermicelli

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2, 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Vermicelli. Definitions of vermicelli and of semolina vermicelli, kinds of materials used in making, permissible percentage of moisture.

U. S. Gov., Federal Specifications Board. 648a; 1929. Spaghetti, Macaroni, and Vermcelli. For solid or tubular stem, in conformity with Federal food and drugs act and subsequent decisions, of American manufacture, requirements on approximate dimensions, percentage of protein, permissible moisture, analysis in accordance with methods of Assn. of Official Agricultural Chemists.

References.—*See* references under 108.41.

108.5 DIABETIC FOOD

References.—Gluten flour. *See* 107.2.

108.9 MISCELLANEOUS SPECIFICATIONS FOR BAKING PRODUCTS

U. S. Gov., Federal Specifications Board. EE–B–351; 1931. Biscuit (Hard Bread) or Canned Biscuit. Requirements on freedom from artificial coloring, preservatives, and impurities, general quality of flour and of wheat used, permissible moisture and salt free ash, to conform to Federal food and drugs act.

References.—Methods of analysis, food regulations. *See* 108.0, 100. Flour. *See* 107.3.

109. MISCELLANEOUS GRAIN PREPARATIONS

109.1 GRITS

References.—Hominy grits. *See* 109.2. Corn chops and grits for feed. *See* 119.2.

109.2 HOMINY

U. S. Gov., Federal Specifications Board. N–H–521; 1931. Hominy Grits. For fine and for coarse types, made of white corn, hulled and degermed, shall be of good color, sound, bright, and free from smut, conforming to Federal food and drugs act.

U. S. Gov., Federal Specifications Board. N–H–541; 1931. Lye Hominy, Canned. Requirements on quality of corn used, on uniform size, color, and general quality of hominy grains, permissible amount of black tips and discolored grains, to conform to Federal food and drugs act, fill of cans, amount of liquor.

References.—Hominy as stock feed. *See* 117.2. Methods of analysis, food regulations. *See* 100. Corn. *See* 103.1.

109.3 CORN FLAKES, CORN BREAKFAST FOODS

U. S. Gov., Federal Specifications Board. N–C–191; 1931. Cereals (Breakfast Foods). Includes corn flakes, requirements on preparation and general qualities of product, freedom from rancidity, mustiness, grit, dirt, etc., in conformity with Federal food and drugs act.

References.—Methods of analysis, food regulations. *See* 100.

109.4 OATMEAL AND ROLLED OATS

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and standards for Food Products. Used in enforcement of food and drugs act. Oatmeal. Definition, required percentage of nitrogen, permissible percentages of moisture, crude fiber, and ash.

U. S. Gov., Federal Specifications Board. N-O-41; 1931. Oatmeal and Rolled or Flaked Oats. Requirements on general quality of oats from which made, permissible moisture, crude fiber, and ash, and required nitrogen for oatmeal, grade of oats and general quality of product for regular rolled or flaked oats and for the quick variety, to conform to Federal food and drugs act.

References.—Methods of analysis, food regulations. *See* 100. Oats. *See* 104.1.

109.5 PUFFED RICE

U. S. Gov., Federal Specifications Board. N-C-191; 1931. Cereals (Breakfast Foods). Includes prepared rice cereal, processed and puffed, requirements on general quality of product, freedom from rancidity, mustiness, chaff, dirt, grit, etc., in conformity with Federal food and drugs act.

References.—Methods of analysis, food regulations. *See* 100.

109.6 WHEAT BREAKFAST FOODS

U. S. Gov., Federal Specifications Board. N-C-191; 1931. Cereals (Breakfast Foods). Includes bran flakes, prepared bran, puffed wheat. shredded wheat, wheat cream meal, and whole wheat meal, requirements on preparation, general qualities of product, freedom from rancidity, mustiness, chaff, dirt, grit, etc., in conformity with Federal food and drugs act. Permissible moisture and required protein for wheat cream meal, permissible moisture and required gluten for whole wheat meal.

References.—Farina. *See* 109.7. Method of analysis, food regulations. *See* 100.

109.7 FARINA

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Purified Middlings, Semolina, and Farina. Definitions, permissible moisture.

References.—Methods of analysis, food regulations. *See* 100., 107.3. Wheat middlings for animal feed. *See* 118.3.

109.9 MISCELLANEOUS SPECIFICATIONS FOR GRAIN PREPARATIONS

U. S. Gov., Federal Specifications Board. N-C-191; 1931. Cereals (Breakfast Foods). Includes malted cereal commercially known as grape nuts, prepared from whole wheat flours and barley malt, requirements on preparation, general quality of product, freedom from burnt grains, rancidity, dirt, grit, etc., in conformity with Federal food and drugs act.

U. S. Gov., Federal Specifications Board. N-T-101; 1931. Tapioca. Covers pearl tapioca and granulated tapioca, shall be sound, white, bright tapioca, conforming to Federal food and drugs act.

References.—Methods of analysis, food regulations. *See* 100.

110-119 FODDERS AND FEEDS

110. GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Plants. Methods for determination of sand and silica, calcium, magnesium, manganese, sodium and potassium, copper, zinc, sulphur, phosphorus, chlorine, total nitrogen, and tentative methods for moisture, ash, iron, aluminum, arsenic, sugars, sucrose, starch, ether extract, and crude fiber.

111. HAY

111.0 GENERAL ITEMS

U. S. Gov., Congress. 43 Stat. 822, 844-845; 1925. An act making appropriations for the Dept. of Agriculture for the fiscal year ending June 30, 1926. For enabling the Sec. of Agriculture to investigate and certify to shippers and other interested parties the class, quality, and/or condition of cotton, and fruits, vegetables, poultry, butter, hay, when offered for shipment in interstate shipment or received at central markets.

111.1 ALFALFA HAY

National Hay Assn., Inc. Grades of Hay and Straw; 1922. Alfalfa Hay. Definitions of 6 grades with requirements on color, permissible defective hay and foreign matter, baled.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Handbook H. F., S. 540. and Amend. 2; 1929. Handbook of Official Hay Standards. Alfalfa and Alfalfa Mixed Hay. Permissive standards, definitions of 10 classes as regards percentages of various hays and grasses for alfalfa and alfalfa mixed with timothy, clover, grass, johnson, and grain hay, definitions of 3 grades in each class as regards per cent leaves, green color, and foreign material, definitions of extra leafy, leafy, extra green, green, and coarse as special grades.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Includes alfalfa and alfalfa mixed hay, to conform to one of the U. S. grades as promulgated by U. S. Dept. of Agriculture.

References.—Alfalfa meal. *See* 112.5. Alfalfa mixed hays. *See also* 111.5.

111.2 CEREAL HAY

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Cereal Hay. Definitions of 3 grades of wheat or oats with permissible amount of rye, baled.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Barley hay. For 2 grades, general quality and color requirements, permissible oat hay, wheat hay, early cut legumes, foreign material and fox tail, age at cutting.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Red oat hay. For 2 grades, requirements on general quality and color, permissible wild oat hay, barley or wheat hay, legumes, injurious material and fox tail, age at cutting.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Wheat hay. For 2 grades, requirements on general quality and color, permissible oat hay, barley hay, early cut legumes, foreign material and fox tail, age at cutting.

References.—Wild oat hay. *See* 111.99. Cereal mixed hays. *See also* 111.5.

111.3 BERMUDA HAY

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Bermuda Hay. Definitions of 3 grades including color, permissible native grasses in each, baled.

111.4 CLOVER HAY

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Clover Hay. Definitions of two grades with permissible timothy and other grasses, baled.

New York Produce Exchange. Rules Regulating the Hay and Straw Trade; 1915. Grades of Hay. Clover Hay. Definitions of 2 grades of baled hay, general requirements on color, soundness, sweetness.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Handbook H. F. S. 540 revised and Amend. 2; 1929. Handbook of Official Hay Standards. Timothy and Clover Hay. Permissive standards, definitions of 8 classes dependent on percentages of clover, timothy, and other grasses, definitions of 3 grades for each class dependent upon per cent green color, and amount of foreign material, definitions of coarse, extra green, and sample grades.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Includes clover hay, to conform to one of the U. S. grades as promulgated by U. S. Dept. of Agriculture.

References.—Clover mixed hay. *See also* 111.5.

111.5 MIXED HAY

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Alfalfa and Johnson Mixed Hay. Definitions of 3 grades with permissible Johnson grass in each grade, baled.

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Alfalfa, Timothy, and Grass Mixed Hay. Definitions of 5 grades with required percentages of constituents for each grade, color, freedom from fox tail, baled.

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Cereal or Grain and Vetch Hay. Definitions of 3 grades with permissible percentage of vetch.

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Clover Mixed Hay. Definitions of 6 grades of clover mixed with timothy and other grasses, required amounts of constituents for each grade, baled.

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Mixed Peavine or Soy Bean Hay. Definitions of 3 grades with permissible amounts of sorghum or crab grass, baled.

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Mixed Timothy and Wild Hay. Definitions of 2 grades with percentages of the two hays in each grade, baled.

New York Produce Exchange. Rules Regulating the Hay and Straw Trade; 1915. Grades of Hay. For clover mixed hay, definitions of 3 grades as regards percentages of clover and timothy, color, soundness, and baling.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Handbook H. F. S. 540 and Amend. 2; 1929. Handbook of Official Hay Standards. Alfalfa and Alfalfa Mixed Hay. Permissive standards, definitions of 10 classes as regards percentages of various hays and grasses for alfalfa and alfalfa mixed with timothy, clover, grass, Johnson, and grain hay, definitions of 3 grades in each class as regards percentage of leaves, green color, and foreign material, definitions of special grades extra leafy, extra green, coarse, etc.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Handbook H. F. S. 540. and Amend. 2; 1929. Handbook of Official Hay Standards. Johnson and Johnson Mixed Hay. Permissive standards, definitions of 5 classes as regards percentage mixtures of Johnson hay with other grasses, with alfalfa, and with lespedeza, definitions of 3 grades for each class as regards per cent of green color and of foreign matter, definitions for extra green, fine, coarse, and sample grades.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Handbook H. F. S. 540 and Amend. 2; 1929. Handbook of Official Hay Standards. Mixed Hay. Permissive standards for mixed hay not covered in other classifications and graded according to the grading rules for the predominating kind.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Handbook H. F. S. 540 and Amend. 2; 1929. Handbook of Official Hay Standards. Timothy and Clover Hay. Permissive standards, definitions of 8 classes as regards percentages of timothy, clover, and other grasses, definitions of 3 grades for each class as regards per cent of green color and of foreign material, definitions of coarse, extra green, and sample grades.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative U. S. Standards for Soybean and Soybean Mixed Hay; 1928. Permissive standards, definitions of 5 classes dependent on percentage of soybean hay and of other grasses and Johnson hay, definitions of 3 grades of each class as regards leafiness, per cent green color, and per cent foreign material, definitions of extra green, leafy, coarse, and sample grades.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Grain and wild oat mixed hay. For 2 grades of red oat and/or wheat hay with 10 to 40 per cent wild oat hay, requirements on general quality and color, permissible barley hay, early cut legumes, foreign material and fox tail, age at cutting.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Includes mixed hay, to conform to one of the U. S. grades as promulgated by U. S. Dept. of Agriculture.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Wild oat and grain mixed hay. For 2 grades of hay containing over 40 per cent wild oat and 30 per cent red oat hay and/or wheat hay, requirements on general quality and color, and age at cutting, permissible barley hay and early cut legumes.

111.6 TIMOTHY HAY

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Timothy Hay. Definitions of 3 grades of baled hay, with permissible amount of other grasses and foreign matter.

New York Produce Exchange. Rules Regulating the Hay and Straw Trade; 1915. Grades of Hay. Timothy hay, 6 grades, definitions as regards purity and allowable other grasses, color, soundness, baling.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Handbook of H. F. S. 540 and Amend. 2; 1929. Handbook of Official Hay Standards. Timothy and Clover Hay. Permissive standards, definitions of 8 classes as regards percentages of timothy, clover, and other grasses, definitions of 3 grades for each class as regards per cent of green color and of foreign material, definitions of coarse, extra green, and sample grades.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Includes timothy hay, to conform to one of the U. S. grades as promulgated by U. S. Dept. of Agriculture.

References.—Timothy mixed hay. *See also* 111.5.

111.9 MISCELLANEOUS SPECIFICATIONS FOR HAY

111.91 Johnson Hay

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Johnson Hay. Definitions of 3 grades with percentage of mixed hays permitted, sun bleach, etc., baled.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Handbook H. F. S. 540 and Amend. 2; 1929. Handbook of Official Hay Standards. Johnson and Johnson Mixed Hay. Permissive standards, definitions of 5 classes of Johnson hay and of the mixed hay as regards per cent of other grasses, definitions of 3 grades for each class as regards per cent of green color and of foreign matter, definitions for extra green, fine, coarse, and sample grades.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Johnson and Johnson mixed hay, to conform to one of the U. S. grades as promulgated by the U. S. Dept. of Agriculture.

References.—Johnson mixed hay. *See also* 111.5.

111.92 Lespedeza Hay

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Lespedeza Hay. Definitions of 2 grades with permissible percentages of native grasses, baled.

111.93 Prairie Hay

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Prairie Hay. Definitions of 6 grades with permissible percentages of weeds.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Handbook H. F. S. 540. and Amend. 2; 1929 Handbook of Official Hay Standards. Prairie Hay. Permissive standards, definitions of 4 classes as regards percentages of upland and midland grasses, legumes, etc., definitions of 3 grades in each class as regards per cent green color and of foreign material, definitions of extra green, coarse, and sample grades.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Includes prairie hay, to conform to one of the U. S. grades as promulgated by U. S. Dept. of Agriculture.

111.94 Peanut Hay

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Peanut Hay. Definitions of 3 grades including permissible amounts of native grasses, foreign matter and dirt, baled.

111.95 Peavine Hay

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Peavine or Soy Bean Hay. Definitions of 5 grades with permissible native grasses or foreign matter.

111.96 Salt or Alkali Hay

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Salt or Alkali Hay. Definitions of 4 grades of baled hay with permissible percentages of weeds for each.

111.97 Sudan Hay

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Sudan Hay. Same as Johnson hay. *See* 111.91.

111.98 Midland Hay

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Midland Hay. Definitions of 2 grades with permissible amount of weeds.

111.99 Specifications for Hay not Elsewhere Classified

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Packing Hay. Definition.

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Peavine or Soy Bean Hay. Definitions of 5 grades with permissible native grasses or foreign matter.

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Sample Hay. Sound baled hay not covered by other grades.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Handbook H. F. S. 540 and Amend. 2; 1929. Handbook of Official Hay Standards. Grass Hay. Permissive standards, definitions of grass hay and of 3 grades as regards per cent green color and of foreign matter, definitions of extra green, coarse, and sample grades.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative U. S. Standards for Soybean and Soybean Mixed Hay; 1928. Permissive standards, definitions of 5 classes dependent on percentage of soybean hay and of other grasses and Johnson hay, definitions of 3 grades of each class as regards leafiness, per cent green color and per cent foreign material, definitions of extra green, leafy, coarse, and sample grades.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Includes grass hay, to conform to one of the U. S. grades as promulgated by U. S. Dept. of Agriculture.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Wild oat hay. For 2 grades of not over 30 per cent of grain hays, requirements on general quality and color, permissible barley hay, early cut legumes, foreign material and fox tail, age at cutting.

112. OIL SEED CAKES AND OIL CAKE MEAL

112.0 GENERAL ITEMS

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Definitions of oil cake, oil meal, and ground oil cake.

National Cottonseed Products Assn. Rules; 1930. Rules 96 to 99. Cracked Cake and Screenings. Definitions of 4 size grades, requirements on freedom from meal and screen grading for each grade.

112.1 FLAXSEED (LINSEED) OIL CAKE AND MEAL

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For linseed and flax products, definitions of linseed cake or meal, flax plant by-product, flaxseed meal, flaxseed oil cake and feed, screenings oil feed.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Flaxseed meal. Requirements on general quality, conforming to definition given by Assn. American Feed Control Officials.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Linseed cake or meal. Definition, permissible weed seed and foreign material, protein content to be stated with bid. Includes old process oil meal and new process oil meal types.

References.—General definitions. *See also* 112.0. Methods of analysis for cottonseed oil cake. *See* 112.3. Methods of analysis of feeding stuffs. *See* 117.0. Linseed oil. *See* 143.1, 813.5, 848.1.

112.2 PEANUT OIL CAKE AND MEAL

Assn. of Feed Control Officials of U. S. Definitions of Feeding Stuffs; 1930. For peanut products, definitions of oil cake, oil meal, and unhulled peanut oil feed.

National Cottonseed Products Assn. Rules; 1930. Rules 94 and 95. Peanut Cake. Definitions of 1 grade as regards odor, required content of crude protein or of combined protein and fat.

National Cottonseed Products Assn. Rules; 1930. Rules 115 and 116. Peanut Meal. Definition of 1 grade as regards grinding, odor, and required content of protein or of combined protein and fat.

National Cottonseed Products Assn. Rules; 1930. Rules 117 to 119. Whole Pressed Peanuts. Definition of 1 grade as regards manufacture, permissible crude fiber and required protein content.

References.—General definitions. *See also* 112.0. Methods of analysis of cottonseed oil cake. *See* 112.3. Methods of analysis of feeding stuffs. *See* 117.0. Peanuts, peanut oil. *See* 135.5, 142.6.

112.3 COTTONSEED OIL CAKE AND MEAL

American Oil Chemists' Society. Methods of Chemical Analysis; 1930. Cottonseed Cake, Meal, and Meats. Requirements on determination of moisture, oil, and nitrogen, conversion tables for nitrogen into ammonia and protein, dimensions and design of standard jacketed oven for making moisture determination.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Tentative Definitions. Whole Pressed Cottonseed and Ground Whole Pressed Cottonseed. Definitions, each to be designated and sold according to protein content.

National Cottonseed Products Assn. Rules; 1930. Rules 90 to 93. Cotton Seed Cake. Definition. Definitions of 2 grades as regards grade of meal producible therefrom, definition of 1 export grade as regards color, texture, odor, permissible protein and fat combined.

National Cottonseed Products Assn. Rules; 1930. Rules 100 to 104. Cotton Seed Meal. Definitions of 2 grades as regards grinding, approximate color, required percentages of protein, ammonia or nitrogen, definition of 1 export grade as regards grinding, odor, approximate color, and required content of protein and fat combined.

National Cottonseed Products Assn. Rules; 1930. Rules 106 to 109. Whole Pressed Cotton Seed. Definitions of 2 grades as regards color, texture, and required crude protein content.

National Cottonseed Products Assn. Rules; 1930. Rules 244, 245, and 272. Cottonseed Cake, Meal and Meats. Methods of sampling and chemical analysis methods for determination of moisture, oil, nitrogen, ammonia, protein, and color.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Cottonseed meal. Requirements on general quality, odor, color, percentage of protein for prime quality and off quality, conforming to definition given by Assn. of American Feed Control Officials.

References.—General definitions. *See also* 112.0. Cottonseed, cottonseed oil. *See* 141, 142.4, and 813.3. Methods of analysis of feeding stuffs. *See* 117.0.

112.4 COCOANUT OIL CAKE AND MEAL

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Definition of cocoanut oil meal or copra oil meal.

References.—General definitions. *See also* 112.0. Methods of analysis of cottonseed oil cake. *See* 112.3. Methods of analysis of feeding stuffs. *See* 117.0. Cocoanut oil. *See* 142.1.

112.5 ALFALFA MEAL

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For alfalfa products, definitions of chopped alfalfa, alfalfa meal, leaf meal, and stem meal.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Alfalfa meal. Requirements on general quality, conforming to definition given by Assn. American Feed Control Officials.

References.—Alfalfa hay. *See* 111.1.

112.9 MISCELLANEOUS SPECIFICATIONS FOR OIL MEAL AND OIL CAKE

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Definitions of corn oil cake, corn oil meal, corn germ cake, corn germ meal.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Definitions of ivory nut meal.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Definition of palm kernel oil meal.

References.—General definitions. *See also* 112.0. Methods of analysis of cottonseed oil cake. *See* 112.3. Methods of analysis of feeding stuffs. *See* 117.0. Corn meal. *See also* 103.4.

113. STRAW

113.1 RYE STRAW

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Straight Rye Straw. Tangled Rye Straw. Definitions of 2 grades of each, baled.

New York Produce Exchange. Rules Regulating the Hay and Straw Trade; 1915. Grades of Straw. Rye straw, definitions of 2 grades of straight and 2 grades of tangled baled rye straw, general quality requirements such as brightness, cleanness, length of straw, soundness, baling.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Rye straw. For 2 grades of straight rye straw baled and 2 grades of tangled rye straw, general quality requirements and permissible defects.

113.2 OAT STRAW

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Oat Straw. Definitions of 2 grades, the better grade baled.

New York Produce Exchange. Rules Regulating the Hay and Straw Trade; 1915. Oat Straw. For one grade, definition as regards cleanliness, color, length, freedom from chaff and thistle, baled, expressed in general terms.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Oat straw. For 2 grades, general quality requirements, permissible defects.

113.3 WHEAT STRAW

National Hay Assn. (Inc.). Grades of Hay and Straw; 1922. Wheat Straw. Definitions of 2 grades, one grade baled.

New York Produce Exchange. Rules Regulating the Hay and Straw Trade; 1915. Wheat Straw. Definition of one grade as regards color, cleanliness, length, soundness, expressed in general terms, baled.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Wheat Straw. For 2 grades, general quality requirements, permissible defects.

113.4 RICE STRAW

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Rice straw. For 2 grades, general quality requirements, permissible defects.

113.9 MISCELLANEOUS STRAW

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Bedding straw. General quality requirements.

117. FODDERS AND POULTRY FEEDS

117.0 GENERAL ITEMS

American Assn. of Cereal Chemists. Methods for the Analysis of Cereals and Cereal Products;

1928. Feeding Stuffs. Requirements for sampling, preparation of sample, determination of moisture, crude protein, albuminoid nitrogen, amido nitrogen, ash, acidity, crude fat, crude fiber, starch, sugars, and pentosans.

Assn. of Official Agricultural Chemists. Official and Tenative Methods of Analysis; 1930. Grain and Stock Feeds. Determination of moisture, ash, crude protein, albuminoid and amido nitrogen, crude fat or ether extract, starch, pentosans, crude fiber, sugars, tentative methods for galactan, and water-soluble acidity.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Grain and Stock Feeds. Grit in Poultry and Similar Feeds. Tentative methods of determination.

117.1 COTTONSEED FEED

References.—Cottonseed. *See* 141. Cottonseed oil cake and meal. *See* 112.3.

117.2 HOMINY FEED

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For hominy feed, includes definitions of hominy feed, meal or chop and yellow hominy feed, meal or chop.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Hominy feed or white hominy feed. Requirements on general quality, in conformity with definition given by Assn. of American Feed Control Officials.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Yellow hominy feed, yellow hominy meal, or yellow hominy chop. Requirements on general quality, conforming to definition given by Assn. of American Feed Control Officials.

References.—Hominy, food for humans. *See* 109.2. Methods of analysis. *See* 117.0.

117.3 RICE FEED

References.—Rice. *See* 105.1. Rice as a feeding stuff. *See* 119.5. Methods of analysis. *See* 117.0.

117.4 WHEAT FEED

References.—Wheat. *See* 107.1. Wheat as a feeding stuff. *See* 118.1.

118. MILL FEEDS

118.1 WHEAT FEED

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For hard spring wheat products, definitions of standard middlings, flour middlings, red dog, low grade feed flour, bran and standard middlings, mixed feed, and wheat bran.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For winter wheat products, definitions of brown, gray, and white shorts, wheat mixed feed, screenings, scourings, wheat bran.

References.—Wheat. *See also* 107.1. Methods of analysis. *See* 117.0, 100.

118.2 BRAN

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Tentative Definitions. Corn Bran. Definitions, to be neither weevily, rancid, nor musty.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Definition of wheat bran.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Bran. Requirements on general quality of wheat bran and of wheat bran and screenings, in conformity with definitions of Assn. of Feed Control Officials, bidder to specify variety of wheat from which made.

References.—Wheat. *See* 118.1, 107.1. Methods of analysis. *See* 117.0, 100.

118.3 MIDDLINGS

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For hard spring wheat products, definitions of standard middlings, flour middlings, red dog, bran and standard middlings.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For winter wheat products, definitions of brown, gray, and white shorts, wheat mixed feed, screenings, scourings, wheat bran.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2, 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Purified Middlings, Semolina, and Farina. Definitions, permissible moisture.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Standard middlings, brown shorts, flour middlings, gray shorts, and wheat red dog. Requirements on general quality, conforming to respective definitions of Assn. of American Feed Control Officials.

References.—Wheat. *See* 118.1, 107.1. Methods of analysis. *See* 117.0, 100.

118.9 MISCELLANEOUS SPECIFICATIONS FOR MILL FEEDS

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Buckwheat Products. Definition of buckwheat shorts or buckwheat middlings.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For oat products, definitions of groats, hulls, middling, shorts, clipped oat by-product.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Tentative Definitions. Oat Chop, Ground Oats, Pulverized Oats, Crushed Oats and Crimped Oats, Oat Groats, Hulled Oats, Undried Oat Groats, Oat Meal, Ground Oat Groats, Rolled Oat Groats, Oat Mill Feed. Definitions as regards method of production.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs. 1930. For rye products, definitions of bran, feed, red dog, low grade feed flour, middlings, and flour middlings.

References.—Rye, oats, buckwheat, wheat. *See* 106.1, 104.1, 102.1, 107.1. Methods or analysis. *See* 117.0, 100.

119. MISCELLANEOUS FODDERS AND FEEDS

119.1 BEET PULP FEED

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Definition of dried beet pulp.

U. S. Gov., Federal Specifications Board. 25c; 1927. Feeds and Forage. Beet pulp. Requirements on general quality, conforming to definition given by Assn. of American Feed Control Officials.

119.2 CORN CHOPS AND GRITS

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Tentative Definitions. Corn Chop, Ground Corn or Cracked Corn, Screened Corn Chop, Screened Ground Corn, Screened Cracked Corn, Corn Meal, Corn Bran, Corn Feed Meal, Corn Grits, Hominy Grits, and Corn Screenings. Definitions, permissible content of foreign material in corn chop, ground corn or cracked corn and in the screened grades of these.

References.—Corn meal, corn feed meal. *See* 103.4. Methods of analysis. *See* 177.0, 100.

119.3 MEAT MEAL, MEAT SCRAPS, BONE MEAL, BLOOD MEAL

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For animal byproducts, definitions of blood meal, blood flour, digester tankage, and meat scraps, raw bone meal, steamed bone meal and special steamed bone meal.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Crab Meal, and Shrimp Meal. Definitions, required content of protein for crab meal.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Grain and Stock Feeds. Bone in meat scrap or tankage. Tentative method of determination.

References—Methods of analysis. *See also* 117.0.

119.4 BREWERS' AND DISTILLERS' DRIED GRAINS

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For brewers' and distillers' products, definitions of dried grains, corn solubles, rye solubles, malt sprouts, yeast or vinegar dried grains.

U. S. Pharmacopœial Convention (Inc.). Pharmacopœia of U. S. A.; 1926. Malt. For preparation of malt extract for medical purposes, physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Methods of analysis. *See also* 117.0.

119.5 RICE FEED

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For rice products, definitions of bran, hulls, polish, meal, ground rough rice, stone bran and huller bran.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Grain and Stock Feeds. Rice Hulls in Rice Bran. Tentative methods of determination.

References.—Methods of analysis. *See also* 117.0, 100. Rice. *See also* 105.1.

119.6 DIGESTER TANKAGE

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For animal byproducts, definitions of digester tankage, meat meal tankage or feeding tankage, meat scraps, raw bone meal, steamed bone meal and special steamed bone meal.

119.9 MISCELLANEOUS SPECIFICATIONS FOR FODDERS AND FEED

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Apple products. Definitions of dried apple pomace and of dried apple pectin pulp.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For barley products, definitions of barley hulls, barley feed, mixed feed, ground barley.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Definitions of evaporated, concentrated, or condensed buttermilk feed, and of dried buttermilk feed.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs. 1930. Definitions of fish meal and of fish residue meal.

Assn. of American Feed Control Officials. Definitions of Feeding stuffs; 1930. Definition of processed garbage including maximum percentage of glass.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Tentative Definitions. Milk Sugar Feed. Defined as byproduct from manufacture of cheese, required content of lactose.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Definition of mineral feeds as distinguished from feeds containing medicinals or drugs for cure or mitigation of disease.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Tentative definitions of milk products as feeds including dried skimmed milk, condensed skimmed milk, condensed cultured skimmed milk, and milk sugar feed.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930–1931. Tentative Definitions. Table Scrap Meal. Definition, requirements on freedom from metal, crockery, and glass, permissible content of finely ground glass or dull particles of glass.

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. For velvet bean products, definitions of meal and ground velvet bean and pod.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Grain and Stock Feeds. Beans. Tentative methods for determination of hydrocyanic acid formed by the hydrolysis of glucosides in beans.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Grain and Stock Feeds. Calcium Oxide in Mineral Feeds. Tentative method for determination of amount.

References.—Methods of analysis of feeding stuffs. See 117.0. Methods of analysis of milk products. *See also* 021.0. Barley. *See also* 101.0.

120–129 VEGETABLES

120. GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Vegetables and Vegetable Products. Preparation of sample, determination of moisture, ash, sodium chloride, total acids, volatile acids, preservatives, and tentative methods for determination of sugars, coloring matters, and metals for canned vegetables in general.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Metals in Foods. Preparation of reagents, design of apparatus, method for determination of arsenic, tentative method for determinations of tin, copper, zinc, lead, fluorine, manganese.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Plants. Methods for determination of sand and silica, calcium, sulphur, phosphorus, chlorine, total nitrogen, and tentative methods for moisture, ash, iron, aluminum, arsenic, sugars, sucrose, starch, ether extract, and crude fiber.

Canners League of California. California Canned Fruits; 1928. Method of Determining Drained Weight. Procedure and apparatus required for different size cans.

U. S. Gov., Congress. Public No. 446, 67th Congress; February, 1923. Food Products Inspection Law. An act making appropriations for the Dept. of Agriculture for the fiscal year ending June 30, 1924. For enabling the Sec. of Agriculture to investigate and certify to shippers and other interested parties the quality and condition of fruits, vegetables, poultry, butter, hay, when offered for shipment interstate or received at designated central markets.

U. S. Gov., Congress. 34 Stat. 768. June 30, 1906, as amended. (For text see S. R. A., F. D. No. 1. 1930 of Food, Drug, and Insecticide Administration of Dept. of Agriculture.) Federal food and drugs act. An act to prevent the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors, and for regulating traffic therein. Defines conditions which will be considered as adulteration or misbranding for drugs, confectionery, and foods, adopts for drugs the standards of U. S. Pharmacopoeia and Nat. Formulary.

U. S. Gov., Congress. Stat. Public No. 538. 1930. Amendment to pure foods act of 1906. Canned food standardization. Requires that all canned goods (meats and milk excepted) that do not come up to standards of quality, condition, and fill of container, promulgated by Sec. of Agriculture, shall be labeled as being below standard.

U. S. Gov., Congress. 39 U. S. Statutes at Large, pp. 446, 486. U. S. warehouse act, approved Aug. 11, 1916, as amended July 25, 1919 and Feb. 23, 1923. Requirements on licensing and bonding of warehouses used for storage of agricultural products for interstate or foreign commerce, licensing of inspectors, requirements on contents of warehouse receipt including description of products according to official grades and standards of U. S. where such have been fixed or established.

U. S. Gov., Congress. 43 Stat. 822, 844–845; 1925. An act making appropriations for the Dept. of Agriculture for the fiscal year ending June 30, 1926. For enabling the Sec. of Agriculture to investigate and certify to shippers and other interested parties the class, quality, and/or condition of cotton and fruits, vegetables, poultry, butter, hay, when offered for shipment in interstate shipment or received at central markets.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 93; 1925. Rules and Regulations of the Sec. of Agriculture Governing the Inspection and Certification of Fruits, Vegetables, and Other Products, under Act of Congress of Feb. 10, 1925. Regulations about where inspection may be obtained, designation of central markets, who may apply for inspection, form of application, inspection certificates, fees.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 1; 1930. Regulations for Enforcement of Federal food and drugs act. Act applies to foods and drugs shipped in interstate or foreign commerce, standard methods of analysis to be those of U. S. Pharmacopoeia and Nat. Formulary, and of Assn. of Official Agricultural Chemists, regulations regarding the labeling of drugs that do not meet the standards of U. S. Pharmacopoeia or Nat. Formulary, regulations on powdering, on poisonous and deleterious ingredients, and on colors and preservatives, ingredients which require a statement on label, etc. Includes text of act as amended.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 4, Rev. 1; 1931. Amendment of July 8, 1930, to Federal Food and Drugs Act and Requirements Thereunder. Gives text of amendment known as Mapes amendment, regulations on size of type, wording, and location of label for canned foods that are below U. S. standard, definitions of U. S. standards for canned peaches, pears, peas, tomatoes, apricots, and cherries.

References.—Coal-tar food colors. *See* 803.10, 803.13. Preservatives and artificial sweeteners. See 892.

121. FOLIAGE TYPE VEGETABLES, FRESH

121.1 CABBAGES AND CAULIFLOWER

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Grades for Cauliflower; 1925. Permissive standards, definitions of 2 grades as regards compactness, color, maturity, freedom from defects and damage, trim and freshness of jacket leaves, minimum size.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Cabbage; 1928. Permissive standards, definitions of 2 grades as regards uniformity of type, solidity, trim, freedom from defects, decay, and damage; size grades that may be used.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh cabbage. Requirements on general quality, color, freedom from decay and damage, minimum weights for different shaped varieties.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh cauliflower. Requirements on general quality, color, minimum size, amount of trim, freedom from spreading, discolored, or spotted stock.

References.—Canned cabbage. *See* 125.1. Inspection and grading regulations, food laws. *See* 120.

121.2 LETTUCE

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Lettuce; 1930. Permissive standards, definitions of 3 grades as regards varietal similarity, freshness, trim, freedom from decay, defects, and damage, appearance of wrapper.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Lettuce. For head and leaf varieties, requirements on general quality, freedom from defective, decayed, damaged stock, etc.

References.—Inspection and grading regulations, food laws. *See* 120.

121.3 ENDIVE

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Endive or Escarole or Chicory; 1928. Permissive standards, definitions of 2 grades as regards varietal similarity, freshness, trim, development, freedom from decay and damage.

References.—*See* references under 121.2.

121.4 PARSLEY

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Parsley; 1930. Permissive standards, definitions of 2 grades as regards general quality, permissible kinds and amounts of defects.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Parsley. Requirements on general quality, freedom from heated or yellow stock.

References.—*See* references under 121.2.

121.5 SPINACH

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Fresh Spinach for Canning; 1931. Permissive standards, definitions of 4 grades as regards freedom from grass, weeds, roots, decay, damage, and foreign materials.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Spinach; 1931. Permissive standards, not applicable to New Zealand spinach, definitions of 3 grades as regards varietal similarity, growth, trim, freedom from decay and damage.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh spinach. Requirements on general quality, freedom from seed stems, yellow or heated stock, etc.

References.—Canned spinach. *See* 125.5. Inspection and grading regulations, food laws. *See* 120.

121.6 WATER CRESS

121.7 ARTICHOKES

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Globe Artichokes; 1926. Permissive standards, definitions of 3 grades as regards trimming, form, compactness, development, freedom from damage, variation in diameter in package, and marking of size on package.

References.—Inspection and grading regulations, food laws. *See* 120.

121.8 KALE

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Kale. Requirements on general quality, freedom from damage and defects.

References.—*See* references under 121.7.

121.9 MISCELLANEOUS FOLIAGE TYPE VEGETABLES

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Italian Sprouting Broccoli; 1930. Permissive standards, definitions of 2 grades as regards general quality, freedom from defects, minimum size of head and minimum total length.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Mustard Greens; 1928. Permissive standards, definitions of 2 grades as regards freshness, freedom from decay and damage.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Romaine; 1928. Permissive standards, definitions of 2 grades as regards heading, trim, freedom from decay and damage.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Turnip Greens; 1928. Permissive standards, not applicable to seven top turnip or Broccoli greens, definitions of 2 grades as regards freshness and freedom from decay and damage.

References.—Inspection and grading regulations, food laws. *See* 120.

122. FRUIT TYPE VEGETABLES, FRESH

122.1 BEANS, PEAS, OKRA

122.11 Beans

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Fresh Faba (Fava) Beans; 1931. A permissive standard, definitions of 2 grades as regards maturity, fullness of pods, permissible decay, mildew injury, black spot, and other defects and damage.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for String Beans, Wax or Green; 1927. Permissive standards, definitions of 4 grades as regards uniformity of variety and size, freshness, tenderness, freedom from damage, etc.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Lima beans. Requirements on general quality, maturity, freedom from stems, foreign material, decay, injury, etc., for both pod beans and hulled beans.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Green or wax beans. Requirements on general quality, freedom from strings, rough or overmatured stock, etc.

References.—Dried and canned beans. *See* 126.11. Inspection and grading regulations, food laws. *See* 120.

122.12 Lentils

122.13 Peas

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Fresh Peas; 1930. Permissive standards, definitions of 3 grades as regards freshness, tenderness, firmness, maturity, freedom from excessive moisture, decay, and damage, percentage of pod filled with developed peas.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Green peas in pods. Requirements on general quality, freedom from foreign matter, decayed or overheated stock, etc.

References.—Canned peas, dry peas. *See* 126.13. Inspection and grading regulations, food laws. *See* 120.

122.14 Okra

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Okra; 1928. Permissive standards, definitions of 2 grades as regards pods of okra of varietal similarity, as regards freshness, tenderness, shape, freedom from decay and damage.

References.—*See* references under 122.13.

122.2 GREEN CORN

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Green Corn; 1927. Permissive standards, definitions of 3 grades as regards varietal similarity, trim, form, freedom from damage, fullness of cob, freshness of husks.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Sweet green corn. For ear corn in husks, of standard sweet varieties, requirements on general quality, freshness of husks, coverage and quality of kernels, freedom from injured and shriveled stock.

References.—Grain corn, canned corn. *See* 103.1, 126.2. Inspection and grading regulations. *See* 120.

122.3 CUCUMBERS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Slicing Cucumbers; 1927. Permissive standards, definitions of 3 grades as regards shape, freshness, firmness, maturity, freedom from decay and damage, minimum length.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh cucumbers. Requirements on general quality, color, minimum size, freedom from shriveled, spongy, or misshapen stock.

References.—Cucumber pickles. *See* 129.11. Inspection and grading regulations, food laws. *See* 120.

122.4 EGGPLANT

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative U. S. Grades for Eggplant; 1925. Permissive standards, definitions of 3 grades as regards varietal similarity, firmness, smoothness, shape, freedom from damage, uniformity in size, size designated by minimum diameter or number in package.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh egg plant. Requirements on general quality, minimum size, freedom from withered, spongy, or spotted stock.

References.—Inspection and grading regulations, food laws. *See* 120.

122.5 PEPPERS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Sweet Peppers; 1929. Permissive standards, definitions of 4 grades as regards varietal similarity, greenness, maturity, shape, firmness, freedom from defects, decay, and damage, minimum sizes, similar grade definitions for red peppers and for mixed red and green peppers, illustrations of shapes.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Green sweet peppers. Requirements on general quality, freedom from soft or spotted stock.

References.—Regulations on inspection and grading, food laws. *See* 120. Pepper spices. *See* 154.23.

122.6 PUMPKIN AND SQUASH

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh pumpkin. Requirements on general quality, maturity, freedom from rot and injury, etc.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh summer squash. Requirements on general quality, freedom from hard shelled or injured stock, etc.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Winter or Hubbard squash. Requirements on general quality, maturity, freedom from injured or spotted stock, etc.

References.—Canned pumpkin and squash. *See* 126.6. Regulations on inspection and grading, food laws. *See* 120.

122.7 TOMATOES

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Cannery Tomatoes; 1926. Permissive standards, definitions of 3 grades as regards firmness, ripeness, coloring, form, freedom from decay and damage, minimum sizes to be fixed by agreement.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Fresh Tomatoes; 1930. Permissive standards, definitions of 4 grades as regards varietal similarity, maturity, form, smoothness, freedom from defects and damage, package to be marked by minimum size, numerical count, or description of pack.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh Tomatoes. Requirements on general quality, minimum size, freedom from injury, rot, overripe stock, etc.

References.—Canned tomatoes, catsup. *See* 126.7, 129.12. Regulations on inspection and grading, food laws. *See* 120.

123. ROOT TYPE VEGETABLES, FRESH

123.1 BEETS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Sugar Beets. Tentative methods for determination of sucrose.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Bunched Beets; 1927. Permissive standards, definitions of 2 grades as regards uniformity of variety, firmness, smoothness, freedom from decay and damage, length of top, uniformity of bunch sizes.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Beets ("bloods" trimmed). Requirements on general quality, shape, minimum size, freedom from dirt, injury, and extra large beets.

References.—Canned beets. *See* 127.1. Beet pulp. *See* 119.1. Regulations on inspection and grading. food laws. *See* 120.

123.2 CARROTS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Bunched Carrots; 1930. Permissive standards, definitions of 2 grades as regards varietal uniformity, firmness, form, smoothness, freedom from decay and damage, uniformity of bunch sizes, 3 size grades defined.

U. S. Gov., Dept. of Agriculture, Bureau of Agricultural Economics. U. S. Standards for Topped Carrots; 1928. Permissive standards, definitions of 2 grades as regards varietal uniformity, trim, firmness, smoothness, shape, freedom from freezing, decay, and damage, dimensional limits.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh carrots. Requirements on general quality, size limits, freedom from splits, broken or shriveled stock.

References.—Canned carrots. *See* 127.2. Inspection and grading regulations, food laws. *See* 120.

123.3 ONIONS AND SCALLIONS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Bermuda Onions; 1930. Permissive standards, definitions of 4 grades as regards uniformity of variety, maturity, shape, freedom from rot, doubles, splits, seed stems, noticeably pink onions, and damage, with tolerances for each grade, size classification into 3 sizes.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Creole Onions; 1926. Permissive standards, definitions of 2 grades as regards varietal similarity, maturity, shape, freedom from doubles, defects, seed stems, and damage, minimum size.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Northern Grown Onions; 1931. Permissive standards, definitions of 5 grades including commercial, boilers, and picklers grades, requirements on uniformity of variety, maturity, firmness, shape, permissible sunscald, doubles, splits, scallions, damage from freezing, dirt, disease, insects, etc., size limits.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Green onions. Requirements on general quality, freedom from extra large bulbs or slimy stock, etc.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Green scallions. Requirements on general quality, freedom from overmatured or discolored stock, etc.

U. S. Gov., Federal Specifications Board. HHH–O–531; 1930. Onions. For domestic late or northern, domestic bermuda, domestic creole, and other standard market varieties, requirements on general quality, minimum sizes, freedom from doubles, defects, sprouted or damaged stock, etc.

References.—Inspection and grading regulations, food laws. *See* 120.

123.4 PARSNIPS AND TURNIPS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Bunched Turnips; 1927. Permissive standards, definitions of 2 grades as regards varietal similarity, firmness, smoothness, freedom from decay and damage, minimum diameter, freshness of tops.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh parsnips. For trimmed parsnips, requirements on general quality, minimum size, freedom from woody, pithy stock. etc.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh turnips. For white turnips and for yellow or rutabaga turnips, trimmed, requirements on general quality, minimum size, freedom from hollow, pithy, woody stock, etc.

References.—Inspection and grading regulations, food laws. *See* 120.

123.5 POTATOES

123.51 White Potatoes

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Amendment No. 5 to S. R. A. No. 93; 1927. Official Standards for the Inspection of Potatoes. Permissive standards, definitions of 3 grades as regards varietal similarity, shape, freedom from freezing injury, rot, defects and damage, size.

U. S. Gov., Federal Specifications Board. HHH–P–611; 1930. Irish Potatoes. To meet requirements of U. S. Grade No. 1 of Dept. of Agriculture, requirements on general quality, minimum size, freedom from rot or damage, tolerances allowed on deliveries for immediate use and on deliveries to be stored, specifications for shipping crates.

References.—Methods of analysis, grading regulations,l food laws. *See* 120.

123.52 Sweetpotatoes

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Sweetpotatoes; 1926. Permissive standards, definitions of 4 grades as regards varietal similarity, firmness, shape, freedom from decay, freezing injury, defects, and damage, minimum sizes.

U. S. Gov., Federal Specifications Board. HHH–P–621; 1930. Sweetpotatoes. Requirements on similarity of varieties furnished, general quality, freedom from foreign matter, damage, decay, etc., minimum size, tolerances, to meet requirements for U. S. Grade No. 1 of U. S. Dept. of Agriculture.

References.—Methods of analysis, grading regulations, food laws. *See* 120.

123.6 RADISHES

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Bunched Radishes; 1926. Permissive standards, definitions of 2 grades as regards varietal similarity, form, smoothness, firmness, crispness, freedom from decay and damage, freshness and freedom from decay and damage of tops, uniformity in size of bunches and of radishes, minimum radish sizes.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Radishes, red or red and white tips. Requirements on general quality, freedom from pithy or hollow stock, etc.

References.—Methods of analysis, grading regulations, food laws. *See* 120. Prepared horse-radish. *See* 154.13.

123.7 SALSIFY

123.8 SHALLOTS AND GARLIC

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Bunched Shallots; 1927. Permissive standards, definitions of 3 grades as regards form, firmness, crispness, blanching, trim, freedom from damage, freshness and freedom from damage of tops, size grades defined.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Garlic; 1927. Permissive standards, definitions of 2 grades as regards maturity, cure, cleanness, compactness, clove fill, freedom from damage.

References.—Methods of analysis, grading regulations, food laws. *See* 120.

124. STEM TYPE VEGETABLES, FRESH

124.1 ASPARAGUS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Asparagus; 1927. Permissive standards, definitions of 2 grades as regards freshness, trimming, freedom from damage and decay, minimum stalk dimensions.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh asparagus. Requirements on general quality, minimum size, freedom from wilted, crooked, or woody stock, etc.

References.—Canned asparagus. *See* 128.1. Methods of analysis, grading, regulations, food laws. *See* 120. Asparagus sprays. *See* 259.

124.2 CELERY

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Rough Celery; 1928. Permissive standards, definitions of 2 grades as regards trim, varietal uniformity, heart formation, blanching, freedom from pithy branches and damage, standards for indication of number of stalks or of stalk length in container.

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Celery. Requirements on general quality, bleach, freedom from hollow, slimy, stringy, or rusty stock, for trimmed or untrimmed stock.

References.—Methods of analysis, grading regulations, food laws. *See* 120.

124.3 MUSHROOMS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Mushrooms; 1928. Permissive standards, definitions of 2 grades as regards varietal similarity, shape, freedom from disease, spots, and damage, length of trimmed stems, minimum diameter of mushroom, also 4 grades of sizes defined.

References.—*See* references under 124.2.

124.4 RHUBARB

U. S. Gov., Federal Specifications Board. 271; 1925. Vegetables. Fresh rhubarb. Requirements on general quality, freedom from heated or decayed stock.

References.—See references under 124.2.

124.5 SWEET ANISE

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Sweet Anise; 1930. A permissive standard for stalks of sweet anise, definitions of 2 grades as regards firmness, tenderness, trim, blanching, freedom from decay, growth cracks, pithy branches, and other defects, minimum size of bulb.

125. FOLIAGE TYPE VEGETABLES, CANNED OR PRESERVED

125.1 CANNED CABBAGE, SAUERKRAUT, AND CANNED SAUERKRAUT

National Kraut Packers Assn. Grade Definitions for Bulk and Canned Sauerkraut; 1929. For the two types, definitions of 2 grades of each including minimum acidity, uniformity of shredding, color requirements, etc., the fill, salt contents, and acidity to comply with U. S. Gov. regulations.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative Definitions and Grades for Canned Sauerkraut; 1930. Permissive standards, definitions of 3 grades as regards color, cut, absence of defects, crispness, and flavor, net drained weight requirements for standard sized cans.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., Chem. 24; 1920. Item 319. Weights of Sauerkraut in Cans of Various Sizes. Requirements under food and drugs act regarding drained weights for contents of 4 sizes of cans.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sauerkraut. Definition, requirements on percentage of salt used in preparation, and percentage of acid present after fermentation.

U. S. Gov., Federal Specifications Board. JJJ–C–21; 1931. Canned Cabbage. General requirements on preparation and general quality of cabbage used. Requirements on cutting in quarters, and freedom from grit, dirt, and foreign material.

U. S. Gov., Federal Specifications Board. JJJ–S–71; 1931. Canned Sauerkraut. Requirements on preparation, percentage of salt used, general quality of cabbage and of resulting product, required acid in finished product, in oonformity with Federal food and drugs act, analyses in accordance with methods of Assn. of Official Agricultural Chemists. Covers 2 quality grades.

References.—Fresh cabbage. *See* 121.1 Methods of analysis, grading regulations, food laws. *See* 120.

125.2 CANNED LETTUCE

125.3 CANNED ENDIVE

125.4 CANNED PARSLEY

125.5 CANNED SPINACH

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. First Draft of Grades for Canned Spinach (also Turnip Greens and Mustard Greens); 1928. Tentative grades for use under U. S. Warehouse act, definitions of 3 grades as regards color, absence of defects, tenderness and texture, and flavor, standard can sizes and dimensions, requirements on relative weights of liquid and solids, and net drained weight of solids.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., Chem. 24; 1920. Item 320. Weights of Spinach in Cans of Various Sizes. Requirements under food and drugs act regarding drained weights of contents for 4 sizes of cans.

U. S. Gov., Federal Specifications Board. JJJ–S–611; 1931. Canned Spinach. Requirements on general quality, freedom from coarse stems, grit, straw, etc., for 2 quality grades, drained weights for various can sizes.

References.—Fresh spinach. *See* 121.5. Method of analysis, grading regulations, food laws. *See* 120.

125.6 CANNED WATER CRESS

125.9 MISCELLANEOUS CANNED VEGETABLES OF FOLIAGE TYPE

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. First Draft of Grades for Canned Spinach (also Turnip Greens and Mustard Greens); 1928. Tentative grades for use under U. S. warehouse act, definitions of 3 grades as regards color, absence of defects, tenderness and texture, and flavor, standard can sizes and dimensions, requirements on relative weights of liquid and solids, and net drained weight of solids.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., Chem. 24; 1920. Item 320. Weights of Swiss Chard and of Beet Tops in Cans of Various Sizes. Requirements under food and drugs act regarding drained weights of contents for 4 sizes of cans.

References.—Fresh turnip greens and mustard greens. *See* 121.9. Methods of analysis, grading regulations, food laws. *See* 120.

126. FRUIT TYPE VEGETABLES, CANNED OR PRESERVED

126.1 BEANS AND PEAS

126.11 Canned Beans and Dry Beans

American Hospital Assn. Bulletin No. 9, 1923. Specifications for Use in Purchasing Canned Vegetables Packed Under Inspection. Includes National Canners Assn. tentatively adopted grades and U. S. Dept. of Agriculture standards of minimum drained weights for standard size cans. Includes string beans, description of grades.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. String Beans. For 5 sieve sizes and seconds, requirements on grade size for each grade.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. HFS–751, 1926, and Amend. No. 1, 1930. Handbook of U. S. Standards for Beans. Permissive standards for grading of beans, including pea, red kidney, dark red kidney, white kidney, medium white, marrow, yelloweye, brown swedish, great northern, pinto, small white, large white, pink, California red, bayo, cranberry, blackeye, lima, baby lima, butternut, and western red kidney beans, requirements on permissible moisture, splits, damage, other beans, foreign material, and appearance for 4 grades for each type except limas for which 3 grades are defined.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Form H.F.S. 899; 1928. Handbook of U. S. Standards for Soybeans. Permissive standards for dry threshed soybeans, definitions of 5 grades and sample grade as regards test weight, permissible moisture, split and damaged beans, and foreign material, for yellow, green, brown, black, and mixed soybeans.

U. S. Gov., Dept. of Agriculture, Bureau of Agricultural Economics. U. S. Grades for Canned Lima Beans; 1931. For use under U. S. warehouse act, definitions of 4 grades as regards character of liquor, absence of defects, uniformity of color and size, maturity, and flavor, standard sizes and dimensions of cans, required net drained weight for each can size.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tentative Grades for Canned Snap or String Beans; 1929. For use under the U. S. warehouse act, definitions of 4 grades as regards clearness of liquor, absence of defects, uniformity of color and conformity to size, flavor of beans and liquor, and tenderness, standard can sizes and dimensions, permissible head space in can.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., Chem. 24; 1920. Item 314. Weights of Lima Beans in Cans of Various Sizes. For immature grades known as "green" lima beans, requirements on drained weights of contents for 3 sizes of cans under food and drugs act.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., Chem. 24; 1920. Item 315. Weights of Wax and Refugee Beans in Cans of Various Sizes. Requirements on drained weights of contents for 3 can sizes under food and drugs act.

U. S. Gov. Federal Specifications Board. JJJ–B–126; 1931. Canned Lima Beans. For 3 grades, requirements on general quality, percentage of green beans, freedom from skins, split and broken beans, and foreign material, screen grading, drained weight for various sizes of cans, permissible head space in can, in conformity with Federal food and drugs act.

U. S. Gov., Federal Specifications Board. JJJ–B–151; 1931. Canned String (or Snap) Beans. For 3 quality grades of cut or whole type beans, requirements on variety of bean, size grading, uniformity in color, general quality, freedom from rough stock, strings, stems, etc.

U. S. Gov., Federal Specifications Board. JJJ–B–91; 1930. Canned Beans, with pork. For beans in tomato sauce and for beans in plain sauce, requirements on quality and permissible defects for white beans before and after cooking, permissible discolored beans, ingredients in sauces, to conform to Federal food and drugs act.

U. S. Gov., Federal Specifications Board. JJJ–B–96; 1930. Canned Beans, without pork. For beans in tomato sauce and for beans in plain sauce, requirements on general quality and permissible defects in white beans before and after cooking, permissible discolored beans, ingredients in sauces, to conform to Federal food and drugs act.

U. S. Gov., Federal Specifications Board. JJJ–B–106; 1930. Dry Beans. For 5 types, white, kidney, lima, colored, and black-eye beans, requirements on varieties acceptable in each type, to be of 2 grades conforming to U. S. Grades No. 1 and No. 2 of U. S. Dept. of Agriculture, specifications for shipping bag.

References.—Fresh string and wax beans. *See* 122.11. Methods of analysis, grading regulations, food laws. *See* 120.

126.12 Canned Lentils

126.13 Canned Peas and Dry Peas

American Hospital Assn. Bulletin No. 9; 1923. Specifications for Use in Purchasing Canned Vegetables Packed Under Inspection. Includes National Canners Assn. tentatively adopted grades and U. S. Dept. of Agriculture standards of minimum drained weights for standard size cans. Includes peas, description of grades.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Grades for Canned Peas; 1930. Mandatory for use under U. S. warehouse act, definitions of 4 grades as regards clearness of liquor, absence of defects, uniformity of size, type and color, flavor of peas and liquor, tenderness, standard can sizes and dimensions, permissible head space in can or drained weight of contents requirements.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., Chem. 24; 1920. Item 318. Weights of Peas and Unpitted Cherries in Cans of Various Sizes. Requirements under food and drugs act regarding drained weights of peas for 3 sizes of cans.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S.R.A., F.D. No. 4, Rev. 1; 1931. Amendment of July 8, 1930, to Federal Food and Drugs Act and Requirements Thereunder. Canned Peas. Definition of the standard below which a substandard label will be required by law, requirements on color, test for tenderness, permissible added water, permissible broken skins.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C10; 1924. Legal Weight per Bushel of Various Commodities. For peas, weight of bushel as defined by Federal statutes, also the weight as established by various States.

U. S. Gov., Federal Specifications Board. JJJ–P–151; 1931. Canned Peas. For early peas and for sugar peas, screen grading requirements for 6 sizes, definitions of 3 quality grades, including requirements on uniformity of color and size, clearness of liquor, flavor, freedom from skins, split peas, and other defects, freedom from dirt, etc., required fill of cans, in conformity with Federal food and drugs act.

References.—Fresh peas. *See* 122.13. Methods of analysis, grading regulations, food laws. *See* 120.

126.2 CANNED CORN AND SUCCOTASH

American Hospital Assn. Bulletin No. 9; 1923. Specifications for Use in Purchasing Canned Vegetables Packed Under Inspection. Includes National Canners Assn. tentatively adopted grades and U. S. Dept. of Agriculture standards of minimum drained weights for standard size cans. Includes corn, description of grades.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Grades for Canned Corn (Cream Style); 1930. Mandatory for use under U. S. warehouse act, definitions of 4 grades as regards color, consistency, absence of defects, cut, maturity, and flavor, standard can sizes and dimensions, required net weight of contents per can.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Grades for Canned Corn (Whole Grain Style); 1931. Mandatory for use under U. S. warehouse act, definitions of 4 grades as regards color, absence of defects, uniformity of cut, maturity, and flavor, standard can sizes and dimensions, required drained net weight of contents.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A. Chem. 26. Item 341. Weight of Maryland Style Corn in No. 2 Cans. Requirements on average and minimum drained weights under food and drugs act.

U. S. Gov., Federal Specifications Board. N–C–501; 1931. Canned Corn. For cream style and for whole grain style, 3 quality grades, requirements on acceptable varieties, general quality of corn, freedom from defects, cob, etc.

References.—Fresh corn. *See* 122.2. Methods of analysis, grading regulations, food laws. *See* 120.

126.3 CANNED CUCUMBERS

References.—Cucumber pickles. *See* 129.11.

126.4 CANNED EGGPLANT

126.5 CANNED PEPPERS

126.6 CANNED PUMPKIN AND SQUASH

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. First Draft of Definitions and Standards for Canned Pumpkin and Squash; 1929. Tentative standards for use under U. S. warehouse act, definitions of 3 grades as regards consistency, color, texture and finish, absence of defects, and flavor, standard sizes and dimensions of cans, required net weight of contents and permissible head space in can.

U. S. Gov., Federal Specifications Board. JJJ–P–791; 1931. Canned Pumpkin. Requirements on general quality, freedom from excessive moisture, skins, and seed, for 2 quality grades, net weight contents of cans.

References.—Methods of analysis, grading regulations, food laws. *See* 120. Fresh pumpkin and squash. *See* 122.6.

126.7 CANNED TOMATOES AND TOMATO JUICE

American Hospital Assn. Bulletin No. 9; 1923. Specifications for Use in Purchasing Canned Vegetables Packed Under Inspection. Includes National Canners Assn. tentatively adopted grades and U. S. Dept. of Agriculture standards of minimum drained weights for standard size cans. Includes tomatoes, description of grades.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Vegetables and Vegetable Products. Tomato Products. Preparation of sample, determination of ash, alkalinity of ash, sodium chloride, reducing sugars, sucrose, acetic and citric acids; tentative methods for determination of solids, sand, microanalysis for molds, yeasts, spores, bacteria.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Grades for Canned Tomatoes; 1930. Mandatory for use under U. S. warehouse act, definitions of 4 grades as regards percentage of whole tomatoes, solidity, color, absence of defects, and flavor, standard can sizes and dimensions, requirements on net weight of contents and permissible head space in can.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Canned Tomato Juice. Definition of the product for use in enforcing the Federal food and drugs act.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 4, Rev. 1; 1931. Amendment of July 8, 1930, to Federal Food and Drug Act and Requirements Thereunder. Canned Tomatoes. Definition of the standard below which a substandard label will be required by law, requirements on test of size of pieces, color in terms of primary distribution curves, permissible peel and defects.

U. S. Gov., Federal Specifications Board. JJJ–T–571; 1931. Canned Tomatoes. For 3 quality grades, preparation, quality, drained weights.

References.—Fresh tomatoes, catsup. *See* 122.7, 129.12. Methods of analysis, grading regulations, food laws. *See* 120.

127. ROOT TYPE VEGETABLES, CANNED OR PRESERVED

127.1 CANNED BEETS

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Beets. For 5 grades, requirements on size for each grade, general quality, uniformity of color and size.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. First Draft of Grades for Canned Beets; 1929. Tentative grades for use under the U. S. warehouse act, definitions of 3 grades as regards uniformity of size and color, absence of defects, tenderness and texture, and flavor, standard can sizes and dimensions, required net weight of contents per can.

U. S. Gov., Federal Specifications Board. JJJ–B–181; 1931. Canned Beets. For cut beets and for whole beet types in 2 quality grades.

References.—Fresh beets. *See* 123.1. Methods of analysis, grading regulations, food laws. *See* 120.

127.2 CANNED CARROTS

Northwest Canners Assn. Canned Fruits and Vegetables. 1926. Carrots. For 4 grades including sliced and quartered, requirements for size for each grade, general quality and color.

U. S. Gov., Federal Specifications Board. JJJ–C–76; 1931. Canned Carrots. Quality and sizes, 2 grades of whole, quartered, sliced, or diced.

References.—Fresh carrots. *See* 123.2. Methods of analysis, grading regulations, food laws. *See* 120.

127.3 CANNED ONIONS

127.4 CANNED PARSNIPS AND TURNIPS

127.5 CANNED POTATOES

127.51 Canned White Potatoes

127.52 Canned Sweetpotatoes

U. S. Gov., Federal Specifications Board. JJJ–P–611; 1931. Canned Sweet Potatoes. Two grades.

127.6 CANNED RADISHES

127.7 CANNED SALSIFY

128. STEM TYPE VEGETABLES, CANNED OR PRESERVED

128.1 CANNED ASPARAGUS

U. S. Gov., Federal Specifications Board. JJJ–A–711; 1931. Canned Asparagus. For 3 types, spears, tips, and soup tips and cuts, and for 4 sizes, requirements on general quality, freedom from tough, fibrous, or damaged stock, clearness of liquor, number of tips to container, in conformity with Federal food and drugs act.

References.—Fresh asparagus. *See* 124.1. Methods of analysis, grading regulations, food laws. *See* 120.

128.2 CANNED CELERY

128.3 CANNED MUSHROOMS

U. S. Gov., Federal Specifications Board. JJJ–M–851; 1931. Canned Mushrooms. For 3 sizes of button type, fancy or sliced, requirements on freedom from artificial coloring, preservatives, and impurities, in conformity with Federal food and drugs act.

128.4 CANNED RHUBARB

129. MISCELLANEOUS VEGETABLE FOOD PRODUCTS

129.1 PICKLES AND SAUCES

129.11 Pickles and Pickled Olives

National Pickle Packers Assn. Pickle Standards; 1925. Grade definitions for 4 standard grades of pickles in salt, including size limits and percentage of crooked pickles and nubbins allowable for each grade, color, and soundness requirements, etc., standard weight of drained pickles for 45 gallon container, general quality requirements for Dill pickles, and of sweet and sour pickles.

National Pickle Packers Assn. Official Chart. Undated. Illustrated chart showing graded sizes of straight pickled cucumbers with the number per 45 gallon cask for each size, crooked pickles and nubbins also illustrated.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Pickles. Defined as cucumber pickles preserved in vinegar, etc.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Salt Pickles. Defined as immature cucumbers preserved in salt solution.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sweet Pickles. Defined as pickled cucumbers or other vegetables in preparation of which sugar is used.

U. S. Gov., Federal Specifications Board. JJJ–P–391; 1931. Pickles and Relishes. For 6 types, sour cucumbers, dill, sour or sweet chowchow, sour or sweet gherkins, sour or sweet mixed, sweet relish, requirements on general quality of materials entering into product, curing and test for curing, size limits and grades, ingredients and make-up of mixed pickles and relish, freedom from artificial color, adulterants, and impurities, in conformity with Federal food and drugs act.

References.—Fresh cucumbers. *See* 122.3. Methods of analysis, grading regulations, food laws. *See* 120. Fresh and pickled olives. *See* 131.4.

129.12 Catsup

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Catchup. Definition of, made from ripe tomatoes with sugar, vinegar, salt, spice, etc.

U. S. Gov., Federal Specifications Board. JJJ–C–91; 1931. Tomato catsup. Requirements on general quality of tomatoes and of finished product, freedom from dirt, artificial coloring or thickening, and chemical preservatives, requirements on content of total solids, permissible yeasts, spores, bacteria, and mold filaments, to use methods of analysis of Assn. of Official Agri. Chemists, in conformity with Federal food and drugs act.

References.—Fresh tomatoes, canned tomatoes. *See* 122.7, 126.7. Methods of analysis, food laws. *See* 126.7, 120.

129.13 Sauces

U. S. Gov., Federal Specifications Board. EE–S–71; 1930. Chili and Worcestershire Sauces. For worcestershire sauce, requirements on freedom from artificial coloring, preservatives, and impurities, sauce to be pungent and of good flavor, methods of chemical analysis in accordance with methods of Assn. of Official Agricultural Chemists, requirements on construction of shipping kegs.

U. S. Gov., Federal Specifications Board. EE–S–71; 1930. Chili and Worcestershire Sauces. For chili sauce, requirements on general quality, ripeness, and color of tomatoes, preparation of tomatoes and addition of spices, permissible molds, bacteria, yeast, and spores, and freedom from artificial coloring, preservatives, and impurities, methods of test as specified by Assn. of Official Agri. Chemists.

References.—Methods of analysis, food laws. *See* 120. Tomato catsup. *See* 129.12. Chili pepper. *See* 154.23.

129.14 Salad Dressing

References.—Salad oil and mayonnaise. *See* 142.94.

129.2 SOUPS

129.20 General Items.

U. S. Gov., Federal Specifications Board. JJJ–S–581; 1931. Canned Soups. Requirements on general quality of vegetables used, use of meat products that have passed U. S. Government inspection, freedom from adulterations and impurities, in conformity with Federal food and drugs act.

References.—Methods of analysis, food laws. *See* 120.

129.21 Bouillon Cubes and Beef Extract

130–139 FRUITS AND NUTS

130 GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Fruits and Fruit Products. Preparation of sample, determination of alcohol, moisture in dried fruits, solids, ash, sulphur in ash, protein, acidity, sucrose, reducing sugar, commercial glucose, starch, preservatives, sweetening substitutes, and tentative methods for determining insoluble solids, total sulphur including methods for sulphured products, chlorine in ash, potassium, manganese, calcium, magnesium, alcohol precipitate, pectic, tartaric, and citric acids, free mineral acids, dextrine, gelatine in jellies and jams, agar agar in jellies, added water in white grape juice, metals, and coloring matters.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 4, Rev. 1; 1931. Amendment of July 8, 1930, to Federal Food and Drugs Act and Requirements Thereunder. Text of amendment known as Mapes amendment, regulations on size of type, wording, and location of label for canned foods that are below U. S. standard, definitions of U. S. standards for canned peaches, pears, peas, tomatoes, apricots, and cherries.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Liquid food products. For fruit sauces composed of sugar and liquor solutions only, whether for use as such, or for the preparation of canned fruits, permissible minimum content of sugar and permissible percentage of alcohol.

131. SUBTROPICAL FRUITS, FRESH AND PRESERVED

131.1 BANANAS

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Bananas. For yellow bananas, requirements on general quality, minimum size and number of hands to bunch.

References.—Methods of analysis, grading regulations, food laws. *See* 130, 120.

131.2 CITRUS FRUITS

131.20 General Items

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Florida Citrus Fruits; 1930. Permissive standards, definitions of 4 grades as regards varietal similarity, maturity, color, firmness, form, smoothness, thin skinned, freedom from decay, blemishes and damage, may also be graded as bright or russet, requirements on standard pack.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Texas Citrus Fruits; 1930. Permissive standards, definitions of 4 grades as regards varietal similarity, maturity, color, firmness, smoothness, thinness of skin, freedom from decay, blemishes, and damage, additional color classification, standard pack requirements.

References.—Methods of analysis, grading regulations, food laws. *See* 130, 120.

131.21 Citron

U. S. Gov., Federal Specifications Board. 634a; 1929. Dried (Evaporated) Fruits. Citron. Requirements on general quality, in conformity with Federal food and drugs act and decisions.

References.—Citrus fruits of Florida and Texas. *See* 131.20. Methods of analysis, grading regulations, food laws. *See* 130, 120.

131.22 Grapefruit

California Fruit Growers Exchange. Grade Specifications for Grape Fruit; 1926. Quality requirements as to maturity, eating quality, form, color, texture, freedom from spongy, scarred, blemished, scale, thick skin, frost damage, etc., percentage of soluble solids to acid in juice, for two grades.

Florida Citrus Exchange. Grading Rules; 1927–1928. For grapefruit, definitions of various grades under two general grade classifications, dependent on firmness, maturity, thinness of skin, damage, blemishes, discoloration, insects, smoothness, etc.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for California and Arizona Grapefruit; 1929. Permissive standards, definitions of 4 grades as regards similarity in color and shape, maturity, color, firmness, form, smoothness, thinness of skin, freedom from decay, blemishes, and damage, standard pack requirements.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Grapefruit, Pomelo. Definition, requirement on ratio of soluble solids to acid in the juice.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Grapefruit. Requirements on general quality, thinness of skin, freedom from defects.

References.—Florida and Texas grapefruit. *See also* 131.20. Methods of analysis, grading regulations, food laws. *See* 130, 120.

131.23 Lemons

California Fruit Growers Exchange. Grade Specifications for Lemons, 1926. Quality requirements for form, color, freedom from scale, diseases, defects, sponginess, and frost damage, etc., allowable percentage of fruit in any shipment affected by alternaria or interior decay, for two grades.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Lemons. Requirements on general quality, thinness of skin, freedom from skin defects, acceptable sizes.

References.—Florida and Texas lemons. *See also* 131.20. Methods of analysis, grading regulations, food laws. *See* 130, 120.

131.24 Limes

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Limes. Requirements on general quality, juiciness, freedom from frost, foreign matter, blemishes, mold, etc., minimum sizes.

References.—Florida and Texas citrus fruits. *See also* 131.20. Methods of analysis, grading regulations, food laws. *See* 130, 120.

131.25 Oranges

California Fruit Growers Exchange. Grade Specifications for Oranges; 1926. Quality requirements for the fruit for two grades as regards maturity, eating quality, form, color, texture, freedom from scale, disease, splits, frost damage, etc., percentage of soluble solids to acid in the juice.

Florida Citrus Exchange. Grading Rules; 1927–1928. For oranges, definitions of various grades under two general grade classifications, dependent on firmness, maturity, thinness of skin, damage, blemishes, discoloration, insects, smoothness, etc.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for California Oranges; 1929. Permissive standards, definitions of 4 grades as regards varietal similarity, maturity, coloring, firmness, form, smoothness, freedom from decay, defects, and damage, requirements for standard pack.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Oranges. Definition, requirement on ratio of soluble solids to acid in the juice.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Oranges. Requirements on general quality, thinness of skin, freedom from blemishes, acceptable sizes.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Satsuma oranges. Requirements on general quality, juiciness, freedom from rot and injury.

References.—Florida and Texas oranges. *See also* 131.20. Methods of analysis, grading regulations, food laws. *See* 130, 120. Marmalades. *See* 134.54.

131.26 Tangerines

Florida Citrus Exchange. Grading Rules; 1927–1928. For tangerines, definitions of various grades under two general classifications, dependent on firmness, maturity, thinness of skin, damage, blemishes, discoloration, insects, smoothness, etc.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Tangerines. Requirements on general quality, juiciness, freedom from rot, injuries, etc., packing.

References.—Florida and Texas tangerines. *See also* 131.20. Methods of analysis, grading regulations, food laws. *See* 130, 120.

131.3 FIGS

California Peach and Fig Growers Assn. Quality Standards and Method of Classifying and Determining Classifications of 1928 Crop of Dried Peaches and Figs; 1928. Definitions of two grades of dried figs as regards soundness, whole, clean, color, texture, freedom from rot, fermentation, sunburn, damage, insects, etc., the better grade to pass examination by Federal, State, or county officials.

U. S. Gov., Federal Specifications Board. Z–F–351; 1931. Canned Figs. For 2 grades of Calimyrna, Kadota, or Magnolia figs, requirements on general quality, uniformity of size, freedom from blemishes, permissible split figs in can, strength test of packing sirup, number of figs in standard can, construction of wooden packing boxes.

References.—Methods of analysis, grading regulations, food laws. *See* 130, 120.

131.4 OLIVES

California Olive Assn. Harvesting Definition; 1922. Mature fruit defined according to color and ease with which pit is freed from flesh, for mission and manzanillo varieties.

California Olive Assn. Ripe Olive Standards; 1925. For canned olives, requirements on maturity, color, texture, and size grades.

U. S. Gov., Federal Specifications Board. Y–O–451; 1931. Olives. For plain green queen olives, for pimento stuffed manzanillas, and for ripe olives, requirements on size for 6 size grades, uniformity in size and color, freedom from damaged or defective fruit, packing, general quality, permissible soft olives in ripe class, in conformity with Federal food and drugs act.

References.—Methods of analysis, grading regulations, food laws. *See* 130, 120.

131.5 PINEAPPLES

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Suggested Tentative U. S. Grades for Pineapples; 1924. Permissive standards, definitions of 2 grades as regards varietal similarity, firmness, maturity, form, freedom from excessive moisture and damage, uniformity of size in package, numerical count to be marked on package.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Pineapples. Requirements on general quality, color, juiciness, freedom from dry, white, woody or overmatured stock, acceptable sizes.

References.—Methods of analysis, grading regulations, food laws. *See* 130, 120. Canned pineapple. *See* 134.24.

131.6 AVOCADOS

Calavo Growers of California. Avocado Grading Chart; 1929. Definitions of 5 grades according to maturity, solidity, surface and other blemishes, percentage of oil, etc.

References.—*See* references under 131.5.

131.7 POMEGRANATES

California Fruit Exchange. Grade Specifications for Pomegranates; 1928. Requirements on maturity, freedom from rot and damage, uniformity in size, color of juice, per cent acid in juice, in accordance with Calif. Fruit and vegetable standardization law.

References.—*See* references under 131.5.

132. FRESH FRUITS, EXCEPT SUBTROPICAL

132.1 BERRIES, CURRANTS, AND GRAPES

132.11 Berries

American Cranberry Exchange. Varieties, Grades and Brands of Cranberries. Undated. Requirements on size, color, shape, flavor given in general terms for various grades of many varieties, with corresponding brand name, time when available for market given.

Northwest Canners Assn. Grading Rules for No. 1 Fresh Fruits and Berries for Canning Purposes; 1925. Fresh Black Raspberries. Permissible varieties, requirements on firmness, ripeness, color, nonpermitted defects and imperfections, ring measure.

Northwest Canners Assn. Grading Rules for No. 1 Fresh Fruits and Berries for Canning Purposes; 1925. Fresh Blackberries. Requirements on firmness, ripeness, color, nonpermitted defects and imperfections, ring measure.

Northwest Canners Assn. Grading Rules for No. 1 Fresh Fruits and Berries for Canning Purposes; 1925. Fresh Gooseberries. Oregon Champion variety, requirements on firmness, color, nonpermitted defects and imperfections, ring measure.

Northwest Canners Assn. Grading Rules for No. 1 Fresh Fruits and Berries for Canning Purposes; 1925. Fresh Loganberries. Requirements on firmness, ripeness, and color, nonpermitted defects and imperfections, minimum length.

Northwest Canners Assn. Grading Rules for No. 1 Fresh Fruits and Berries for Canning Purposes; 1925. Fresh Red Raspberries. Permissible variety, requirements on firmness, ripeness, color, nonpermitted defects and imperfections, ring measure.

Northwest Canners Assn. Grading Rules for No. 1 Fresh Fruits and Berries for Canning Purposes; 1925. Fresh Strawberries. Permissible varieties, requirements on firmness, ripeness, color, nonpermitted defects and imperfections, ring measure.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Dewberries and Blackberries; 1928. Permissive standards, definitions of 3 grades as regards one variety limitation, firmness, color, development, maturity, freedom from caps, decay, and damage.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Strawberries; 1928. Permissive standards, definitions of 3 grades as regards limitation to one variety, attachment of cap, firmness, maturity, freedom from decay and damage, minimum size.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Berries. For blackberries, blueberries, gooseberries, loganberries, red and black raspberries, requirements on general quality, maturity, freedom from moldy stock, foreign matter, injuries, and defective stock.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Cranberries. Requirements on general quality, uniformity of size, freedom from soft and wet stock.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Strawberries. Requirements on general quality, maturity, minimum size, freedom from moldy stock, injuries, etc.

References.—Canned berries, jams and jellies. *See* 134.11, 134.5. Methods of analysis, grading regulations, food laws. *See* 130, 120.

132.12 Currants

References.—Dried currants. *See* 133.12.

132.13 Grapes

California Fruit Exchange. Grade Specifications for Grapes; 1928. Requirements on maturity, uniform color, attachment to stems, freedom from crushed, dried, defective, and damaged grapes, compactness of bunch, percentage of sugar for various varieties, sizes of bunches and berries for sawdust packed grapes, tolerances for defects.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for American (Eastern Type) Bunch Grapes; 1930. A permissive standard, definitions of 3 grades of table grapes and 2 grades of juice grapes as regards uniformity of variety, coloring, maturity, permissible shattered bunches, split, dried, or soft grapes, mold, decay, damage from hail, insects, diseases, etc., minimum size of berries.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Juice Grapes; 1930. Permissive standards with especial reference to California grapes, definitions of 3 grades of single variety grapes and of 3 grades of mixed variety grapes as regards color, maturity, freedom from shattered, split, and damaged fruit, permissible raisined fruit, sugar test for maturity.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Sawdust Pack Grapes; 1931. Permissive standards with special reference to California grapes, definitions of 3 grades as regards uniformity of variety, coloring, maturity, firmness, permissible shattered, split, wet, wilted, dried berries, mold, decay, and other defects, sizes of bunches and of berries, condition of stems.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Table Grapes; 1931. Permissive standards with special reference to California grapes, definitions of 3 grades as regards uniformity of variety and coloring, maturity, firmness, attachment of berries, permissible crushed, wilted, shot, and dried berries, mold, decay, and damage, weight and form of bunch, quality of stems.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Grapes. For table use with preferred varieties of western and of eastern grown varieties, requirements on general quality, freedom from discolored, overripe, or moldy stock.

References.—Raisins, canned grapes. *See* 133.13, 134.13. Methods of analysis, grading regulations, food laws. *See* 130, 120.

132.2 FLESHY FRUITS

132.21 Apples

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Apples; 1931. A permissive standard, definitions of 9 grades as regards maturity, picking, cleanliness, uniformity of variety, form, permissible decay, internal breakdown, scald, freezing, bruises, etc., permissible damage due to limbrubs, disease, insects, hail, etc., color requirements for 2 grades, 2 early or immature grades included.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Cannery Apples; 1930. Permissive standards, definitions of 3 grades as regards ripeness, freedom from decay, permissible defects and damage, size left to agreement.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C10; 1924. Legal Weights (in pounds) per Bushel of Various Commodities. Apples, weight of a bushel of green or ripe apples as defined by Federal statutes, also the bushel weights for apples established by various States are given.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Apples. Requirements on general quality, freedom from frost, injury, minimum grade, preferred varieties.

References.—Dried apples, canned apples and apple sauce. *See* 133.21, 134.21. Methods of analysis, grading regulations, food laws. *See* 130, 120.

132.22 Pears

California Fruit Exchange. Grade Specifications for Pears; 1928. Requirements on minimum sizes for 13 varieties, maturity, freedom from scale, blemishes, worms, frost marks, etc., weight of packed boxes, uniformity in size in accordance with Calif. standardization law.

Northwest Canners Assn. Grading Rules for No. 1 Fresh Fruits and Berries for Canning Purposes; 1925. Fresh Pears. Bartlett variety, requirements on firmness, ripeness, color, nonpermitted defects and imperfections, length and ring measure.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Grades for Pears; 1925. Permissive standards, definitions of 4 grades as regards limitation to one variety, maturity, cleanness, form, freedom from decay and damage, size to be marked on package as numerical count or minimum diameter.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Pears. Requirements on general quality, freedom from bruised or misshapen stock, preferred varieties, acceptable sizes.

References.—Dried pears, canned pears. *See* 132.22, 134.22. Methods of analysis, grading regulations, food laws. *See* 130, 120

132.23 Quinces

132.3 MELONS

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Grades for Watermelons; 1925. Permissive standards, definitions of 3 grades as regards varietal similarity, maturity, form, freedom from decay, whiteheart, defects and damage, variations from average weight in any lot.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Cantaloupes; 1930. Permissive standards, definitions of 2 grades as regards, firmness, maturity, form, netting, freedom from blemishes, decay and damage.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Honey Dew and Honey Ball Melons; 1927. Permissive standards, definitions of 2 grades as regards maturity, firmness, form, smoothness, freedom from decay, cracks, and damage.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Cantaloupe. Requirements on general quality, maturity, freedom from soft or yellow fruit.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Watermelons. Requirements on general quality, minimum weight, freedom from misshapen, burned, soft, or immature stock.

References.—Methods of analysis, grading regulations, food laws. *See* 130, 120.

132.4 STONE FRUITS

132.41 Apricots

California Fruit Exchange. Grade Specifications for Apricots; 1928. Requirements on minimum size, freedom from blemishes and defects.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Apricots; 1928. Permissive standards, definitions of 3 grades as regards maturity, freedom from decay, damage, dirt, scale, etc., requirement that minimum size, or numerical count, or description of pack be marked on container.

References.—Dried apricots, canned apricots. *See* 133.41, 134.41. Methods of analysis, grading regulations, food laws. *See* 130, 120.

132.42 Cherries

California Fruit Exchange. Grade Specifications for Cherries; 1928. Requirements on size and packing, uniformity in size in accordance with Calif. fruit and vegetable standardization law, freedom from defects, blemishes, bird pecks, etc.

Northwest Canners Assn. Grading Rules for No. 1 Fresh Fruits and Berries for Canning Purposes; 1925. Fresh Cherries. Royal Anne variety, requirements on firmness, ripeness, color, nonpermitted defects and imperfections, weight.

Northwest Canners Assn. Grading Rules for No. 1 Fresh Fruits and Berries for Canning Purposes; 1925. Fresh Sour Cherries. Montmorency variety, requirements on firmness, ripeness, color, nonpermitted defects and imperfections, ring measure.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Red Sour Cherries for Manufacture; 1931. A permissive standard, definitions of 5 grades as regards coloring, permissible decay, stems, worms, and damage caused by pulled pits, hail, bird pecks, disease, foreign material, etc.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Sweet Cherries; 1927. Permissive standards, definitions of 2 grades as regards being of one variety, form, maturity, freedom from decay and damage, size may be specified by minimum diameter or number in pound.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Cherries. For sweet table varieties, requirements on general quality, freedom from blemishes.

References.—Canned cherries. *See* 134.42. Methods of analysis, grading regulations, food laws. *See* 130, 120.

132.43 Dates

132.44 Peaches

California Canning Peach Growers. Form 17; 1925. Canner's Agreement. Includes grade definitions for No. 1 and No. 2 grades of cling or freestone peaches, size limits, blemishes, split pits permissible for canning peaches.

California Fruit Exchange. Grade Specifications for Peaches; 1928. Requirements on maturity, color at which to pick, freedom from blemishes and defects, uniformity in size, official size grades, but no definite size limits set for use with the exchange brand; packing in accordance with Calif. fruit and vegetable standarization law.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Peaches; 1930. Permissive standards, definitions of 4 grades as regards limitation to one variety, firmness, maturity, form, freedom from defects and damage, the fancy grade of above grades also includes requirements on percentage of peaches showing surface covered with characteristic red color, requirement on marking minimum size or numerical count on package.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Peaches. Requirements on general quality, minimum size, freedom from splits, defects, and injuries, preferred varieties.

References.—Dried peaches, canned peaches. *See* 133.44, 134.44. Methods of analysis, grading regulations, food laws. *See* 130, 120.

132.45 Plums and Prunes

California Fruit Exchange. Grade Specifications for Plums; 1928. Minimum sizes and color at which to pick for 35 varieties, packing requirements, freedom from defects and blemishes, and in accordance with Calif. fruit and vegetable standardization law.

Northwest Canners Assn. Grading Rules for No. 1 Fresh Fruits and Berries for Canning Purposes; 1925. Fresh Prunes. Italian variety, requirements on ripeness and color, nonpermitted defects and imperfections, weight.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Plums and Prunes (Fresh); 1931. Permissive standards, definitions of 4 grades as regards limitation to one variety, maturity, firmness, form, freedom from damage and blemishes, method of marking size when packed in 4 basket crates, color and minimum size for Italian prunes.

U. S. Gov., Federal Specifications Board. 270; 1925. Fresh Fruits. Plums. For table variety, requirements on general quality, freedom from scale, blemishes, soft or shriveled stock, preferred varieties, packing.

References.—Dried prunes, canned plums and prunes. *See* 133.45, 134.45. Methods of analysis, grading regulations, food laws. *See* 130, 120.

132.46 Persimmons

California Fruit Exchange. Grade Specification for Oriental Persimmons; 1928. Requirements on maturity, uniformity in size, color, accuracy of count, freedom from damage, cracks, decay, surface blemishes, etc.

References.—Methods of analysis, grading regulations. food laws. *See* 130, 120.

133. DRIED AND EVAPORATED FRUITS

133.1 DRIED BERRIES, CURRANTS, AND GRAPES

133.11 Dried Berries

References.—Fresh berries, jams and jellies. *See* 132.11, 134.5.

133.12 Dried Currants

U. S. Gov., Federal Specifications Board. Z–C–851; 1931. Dried Currants. Requirements on general quality, permissible moisture, in conformity with Federal food and drugs act and decisions. Covers 2 grades.

References.—Methods of analysis, grading regulations, food laws. *See* 130, 120.

133.13 Raisins

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Tech. Bull. No. 1; 1927. Tests of Methods for the Commercial Standardization of Raisins. Description of tests developed for grading raisins and that were put in practical operation by the raisin interests of California, method of procedure for weight per volume test, moisture estimation by compression, mold test, and sand test.

U. S. Gov., Federal Specifications Board. Z–R–71; 1931. Raisins. For seeded muscats, thompson seedless, sultanas, and muscat clusters, screen grading for 2 sizes of each type, requirements on general quality, uniformity of size and color, freedom from mold, rot, insects, damage, sugaring, dirt, etc., permissible moisture content, in conformity with Federal food and drugs act.

References.—Fresh grapes, canned grapes. *See* 132.13, 134.13. Methods of analysis, grading regulations, food laws. *See* 130, 120.

133.2 FLESHY FRUITS, DRIED

133.21 Dried Apples

Assn. of American Feed Control Officials. Definitions of Feeding Stuffs; 1930. Apple Products. General definitions of dried apple pomace and of dried apple pectin pulp.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Evaporated Apples. Definition, permissible moisture as determined by methods of Assn. of Official Agri. Chemists.

U. S. Gov., Federal Specifications Board. Z–A–613; 1931. Evaporated (or Dried) Apples. For 4 grades of ring or sliced apples, peeled and cored, requirements on general quality, sizes of pieces, permissible moisture, permissible sulphuring, freedom from dirt, grit, etc.

References.—Fresh apples, canned apples and apple sauce. *See* 132.21, 134.21. Methods of analysis, grading regulations, food laws. *See* 130, 120.

133.22 Dried Pears

U. S. Gov., Federal Specifications Board. 634a; 1929. Dried (Evaporated) Fruits. Pears. Requirements on preparation, general quality, disallowance of kieffer variety, permissible moisture content of boxed fruit, in conformity with Federal food and drugs act and decisions.

References.—Fresh pears, canned pears. *See* 132.22, 134.22. Methods of analysis, grading regulations, food laws. *See* 130, 120.

133.23 Dried Quinces

133.3 DRIED MELONS

133.4 DRIED STONE FRUITS

133.41 Dried Apricots

U. S. Gov., Federal Specifications Board. Z–A–636; 1931. Evaporated (or Dried) Apricots. For 4 grades of halved and pitted fruit, requirements on general quality, sizes of halves, permissible moisture, permissible sulphuring, freedom from defective stock.

References.—Fresh apricots, canned apricots. *See* 132.41, 134.41. Methods of analysis, grading regulations, food laws. *See* 130, 120.

133.42 Dried Cherries

References.—Fresh cherries, canned cherries. *See* 132.42, 134.42.

133.43 Dried Dates

133.44 Dried Peaches

California Peach and Fig Growers Assn. Quality Standards and Method of Classifying and Determining Classifications of 1928 Crop of Dried Peaches and Figs; 1928. Definitions for two grades of peaches as regards soundness, damage, color, freedom from dirt, mold, insects, green, sunburn, damage by red spider, etc., to pass Federal, State, or county inspection.

U. S. Gov., Federal Specifications Board. Z–P–193; 1931. Evaporated (or Dried) Peaches. For 4 grades of Muir or yellow varieties, halved and pitted, requirements on general quality, sizes, permissible sulphuring, permissible moisture, free from damage.

References.—Fresh peaches, canned peaches. *See* 132.44, 134.44. Methods of analysis, grading regulations, food laws. *See* 130, 120.

133.45 Dried Plums and Prunes

U. S. Gov., Federal Specifications Board. 634a; 1929. Dried (Evaporated) Fruits. Prunes. For 3 size gradings, requirements on general quality, permissible moisture content of boxed fruit, in conformity with Federal food and drugs act and decisions.

References.—Fresh plums and prunes, canned plums and prunes. *See* 132.45, 134.45. Methods of analysis, grading regulations, food laws. *See* 130, 120.

133.5 DRIED SUBTROPICAL FRUITS

References.—Dried figs. *See* 131.3. Dried dates. *See* 133.43. Dried citron. *See* 131.21.

134. CANNED AND PRESERVED FRUITS, JAMS, AND JELLIES

134.1 CANNED BERRIES, CURRANTS, AND GRAPES

134.11 Canned Berries

Assn. of New York State Canners (Inc.). New York Canned Fruits; 1923. Black Raspberries, Columbian Raspberries, Cuthbert Raspberries. Requirements on percentage of sugar in sirup, selection, ripeness, freedom from stems, etc., for 4 grades of each variety.

Assn. of New York State Canners (Inc.). New York Canned Fruits; 1923. Blackberries. Requirements on percentage of sugar in sirup, size, freedom from blemishes and stems, etc., for 4 grades.

Assn. of New York State Canners (Inc.). New York Canned Fruits; 1923. Strawberries. Requirements on percentage of sugar in sirup, uniformity of size and color, permissible seedy berries and hull, etc., for 5 grades.

Michigan Canners Assn. Michigan Canned Fruits; 1923. Gooseberries; Huckleberries; Black Raspberries; Red Raspberries; and Strawberries. For 4 grades of each, requirements on uniformity of size, maturity, freedom from stems and seedy fruit, general quality of fruit, strength of sirup for each grade, packing in enamel lined cans.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Black Raspberries. For 5 grades, requirements on strength of sirup, general quality and uniformity of fruit.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Blackberries. For 5 grades, requirements on strength of sirup; general quality and uniformity of fruit.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Cranberries. For 5 grades, requirements on strength of sirup, general quality and uniformity of fruit.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Gooseberries. For 5 grades, requirements on strength of sirup, general quality and uniformity.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Loganberries. For 3 grades, requirements on strength of sirup and nonpermitted imperfections.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Red Raspberries. For 5 grades, requirements on strength of sirup, general quality and uniformity.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Strawberries. For 5 grades, requirements on strength of sirup, general quality and uniformity.

U. S. Gov., Federal Specifications Board. Z–B–491; 1931. Canned Blueberries (Huckleberries). For 2 grades, requirements on general quality of fruit, freedom from defective and blemished fruit and foreign matter, net weight of filled cans, strength of sirup if required.

U. S. Gov., Federal Specifications Board. Z–L–501; 1931. Canned Loganberries. For 3 grades, requirements on general quality, freedom from blemishes and foreign matter, strength of sirup, use of enamel lined cans, in conformity with Federal food and drugs act.

U. S. Gov., Federal Specifications Board. Z–R–91; 1931. Canned Raspberries. For 4 grades of black raspberries and of red raspberries, acceptable varieties of red raspberries, requirements on general quality of fruit, freedom from blemishes and foreign matter, sugar strength of sirup, packing in enamel-lined cans.

References.—Fresh berries. *See* 132.11. Jams and jellies. *See* 134.5. Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.12 Canned Currants

References.—Dried currants. *See* 133.12.

134.13 Canned Grapes

Canners League of California. California Canned Fruits; 1928. Muscat Grapes. Requirements on percentage of sugar in sirup, ripeness, freedom from blemishes, uniformity in size, etc., for 4 grades.

References.—Fresh grapes, raisins. *See* 132.13, 133.13. Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.2 FLESHY FRUITS, CANNED

134.21 Applesauce and Canned Apples

Assn. of New York State Canners (Inc.). New York Canned Fruits; 1923. Apples, not steamed. Requirements on firmness, size, permissible blemishes and discoloration, paring, coring, etc., for 4 grades.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Apples. Water or solid pack grade, wholesome fruit.

U. S. Gov., Federal Specifications Board. Z–A–611; 1931. Canned Apples. For 3 quality, grades, requirements on general quality, preparation, freedom from dirt, grit, etc., permissible damaged fruit and blemishes in the various grades, minimum net weights for 3 can sizes, in conformity with Federal food and drugs act.

U. S. Gov., Federal Specifications Board. Z–A–621; 1931. Canned Applesauce. Requirements on general quality of apples used, using winter varieties, general qualities of apple sauce, freedom from grit, skin, seeds, etc., consistency, free from preservatives, minimum net weights in cans, in conformity with Federal food and drugs act.

References.—Fresh apples, dried apples. *See* 132.21, 133.21. Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.22 Canned Pears

American Hospital Assn. Bulletin No. 35; 1923. Canned Fruits. Includes specifications of National Canners Assn. Includes pears, definition of grades as regards pieces per can, per cent of sugar in sirup, and description of fruit.

Assn. of New York State Canners (Inc.). New York Canned Fruits; 1923. Bartlett Pears. Requirements on percentage of sugar in sirup, color, ripeness, freedom from blemishes, uniformity in size, etc., pieces per can, for 4 grades.

Canners League of California. California Canned Fruits; 1928. Bartlett Pears. Requirements on percentage of sugar in sirup, color, uniform size, ripeness, freedom from blemishes, pieces per can, etc., for 4 grades.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Pears. For 5 grades, requirements on strength of sirup, general quality and uniformity of fruit, pieces per can.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., Chem. 24; 1920. Item 317. Weights of Pears in Cans of Various Sizes. For firm pears in halves, requirements under food and drugs act on drained weights of contents for 6 sizes of cans.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 4, Rev. 1; 1931. Amendment of July 8, 1930, to Federal Food and Drug Act and Requirements Thereunder. Canned Pears. Definition of the standard below which a substandard label will be required by law, requirements on weight, sugar strength of liquid, color, uniformity of size, test for tenderness, permissible defects and unpeeled fruit.

U. S. Gov., Federal Specifications Board. Z–P–201; 1931. Canned Pears. Includes halves in sirup and pie or water fruit without added sugar. For 3 quality grades of halved pears, peeled and cored, Bartlett variety, requirements on general quality, freedom from blemishes, uniformity in size, texture, etc., sugar strength of sirup, pieces per can, net drained weight of can contents, in conformity with Federal food and drugs act, testing in accordance with methods of Assn. of Official Agricultural Chemists.

References.—Fresh pears, dried pears. *See* 132.22, 133.22. Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.23 Canned Quinces

134.24 Canned Pineapple

American Hospital Assn. Bulletin No. 35; 1923. Canned Fruits. Includes specifications of National Canners Assn. Includes pineapple, definition of grades, number of pieces per can, per cent of sugar in sirup, and description of the fruit.

U. S. Gov., Federal Specifications Board. Z–P–351; 1931. Canned Pineapple. For fancy sliced Hawaiian pineapple, requirements on general quality, uniformity of slices, and sugar strength of sirup, construction of packing boxes, in conformity with Federal food and drugs act, tests according to methods of Assn. of Official Agricultural Chemists.

References.—Fresh pineapple. *See* 131.5. Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.3 CANNED MELONS

134.4 CANNED STONE FRUITS

134.41 Canned Apricots

American Hospital Assn. Bulletin No. 35; 1923. Canned Fruits. Includes specifications of National Canners Assn. Includes apricots, definition of grades of fruit as regards pieces per can, per cent of sugar in sirup, and description of the fruit.

Canners League of California. California Canned Fruits; 1928. Apricots. Requirements on percentage of sugar in sirup, color, uniform size, freedom from blemishes, pieces per can, etc., for 4 grades.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 4, Rev. 1; 1931. Amendment of July 8, 1930, to Federal Food and Drug Act and Requirements Thereunder. Canned Apricots. Definition of standard below which a substandard label will be required by law, requirements on weight, sugar strength of liquid, color, uniformity of size, test for tenderness, permissible defects, allowed exceptions.

U. S. Gov., Federal Specifications Board. Z–A–631; 1931. Canned Apricots. For 3 quality grades of halved and pitted fruit, requirements on general quality, uniformity in size, count per can, sugar strength of sirup, construction of packing boxes, in conformity with Federal food and drugs act, tests according to methods of Assn. of Official Agricultural Chemists.

References.—Fresh apricots, dried apricots. *See* 132.41, 133.41. Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.42 Canned Cherries

American Hospital Assn. Bulletin No. 35; 1923. Canned Fruits. Includes specifications of National Canners Assn. Includes cherries, definition of grades, per cent of sugar in sirup, description of fruit.

Assn. of New York State Canners (Inc.). New York Canned Fruits; 1923. Red Sour Pitted Cherries. Requirements on percentage of sugar in sirup, ripeness, freedom from blemishes, uniform size, percentage pits, etc., for 5 grades.

Assn. of New York State Canners (Inc.). New York Canned Fruits; 1923. Red Sweet Cherries. Requirements on percentage of sugar in sirup, ripeness, uniformity in size, freedom from blemishes, etc., for 4 grades.

Assn. of New York State Canners (Inc.). New York Canned Fruits; 1923. White Cherries. Requirements on percentage sugar in sirup, hard or soft varieties, ripeness, freedom from blemishes, etc., for 4 grades.

Canners League of California. California Canned Fruits; 1928. Royal Anne Cherries, White Cherries, Black Cherries. Requirements on percentage of sugar in sirup, freedom from blemishes, size uniformity, ripeness, etc., number of pieces per can, for 4 grades.

Michigan Canners Assn. Michigan Canned Fruits; 1923. Red Sour Pitted Cherries. For 4 grades packed in enamel lined cans, general requirements on quality, ripeness, permissible blemishes, pits, etc., requirements on strength of sirup for each grade.

National Preservers Assn. Definitions and Standards of Fruit Jams, Preserves, Jellies (included in House Bill H. R. 12693, 70th Congress, April 4, 1928). For maraschino cherries, definitions of, preparation method, permissible percentages of sulphur dioxide and of benzoate of soda.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Black and White Cherries. For 5 grades, requirements on strength of sirup, general quality and uniformity of fruit, count per can.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Cherries. Royal Anne, Bing and Lambert, for 5 grades, requirements on strength of sirup, general quality, uniformity, and count of fruit.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Sour Pitted Cherries. For 5 grades, requirements on strength of sirup, general quality of fruit.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., Chem. 24; 1920. Item 318. Weights of Peas and Unpitted Cherries in Cans of Various Sizes. Requirements under food and drugs act regarding drained weight of contents for 4 sizes of cans for cherries in 2 grades of sirup.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., Chem. 27. Item 364. Weights of Pitted Cherries in Cans of Various Sizes. Requirements on drained weights of contents for 4 sizes of cans, dependent on type of sirup, under food and drugs act.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 4, Rev. 1; 1931. Amendment of July 8, 1930, to Federal food and drug act and requirements thereunder. Canned Cherries. Definition of the standard below which a substandard label will be required by law, requirements on weight of fruit, sugar strength of liquid, color, uniformity of size, fleshiness, permissible blemished fruit, allowable exceptions.

U. S. Gov., Federal Specifications Board. Z–C–301; 1931. Canned Cherries. Covers 3 sweet unpitted varieties, white, black, and royal anne, and 2 sour pitted varieties, red in sirup, and red in water without added sugar. For 3 quality grades, requirements on general quality, uniformity in size and color, freedom from dirt, blemishes, and damaged fruit, sugar strength of sirup, number per can for sweet varieties, in conformity with Federal food and drugs act.

References.—Fresh cherries. *See* 132.42. Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.43 Canned Dates

134.44 Canned Peaches

American Hospital Assn. Bulletin No. 35; 1923. Canned Fruits. Includes specifications of National Canners Assn. Includes peaches, definition of grades of fruit as regards pieces per can, per cent of sugar in sirup, and description of the fruit for new cling peaches, yellow free peaches, and sliced peaches.

Canners League of California. California Canned Fruits; 1928. Yellow Cling Peaches and Sliced Yellow Cling Peaches. Requirements on percentage of sugar in sirup, color, ripeness, uniform size, freedom from blemishes, pieces per can, etc., for 4 grades.

Canners League of California. California Canned Fruits; 1928. Yellow Free Peaches. Requirements on percentage of sugar in sirup, color, ripeness, uniform size, freedom from blemishes, pieces per can, etc., for 4 grades.

Michigan Canners Assn. Michigan Canned Fruits; 1923. Halves Peaches, Sliced Peaches, Whole Peaches. General requirements on uniformity of size, color, shape, freedom from blemishes, sweetness, required strength of sirup for each grade. Covers 4 grades for each type except for whole peaches which has 3 grades.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., Chem. 26. Item 342. Weights of Peaches in Cans of Various Sizes. Regulations under Federal food and drugs acts regarding the weight of sliced or half peaches to be packed in various standard can sizes, dimensions of cans and methods of determination of drained weight of contents.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 4, Rev. 1; 1931. Amendment of July 8, 1930, to Federal food and drug act and requirements thereunder. Canned Peaches. Definitions of the standard below which a substandard label will be required by law, requirements on weight, sugar content of liquid, color, uniformity of size, test for tenderness, permissible defects and unpeeled fruit.

U. S. Gov., Federal Specifications Board. Z–P–191; 1931. Canned Peaches. Covers yellow cling and yellow freestone classes of 3 types, halves in sirup, slices in sirup, and water or pie halves or slices packed without added sugar. For 3 quality grades except as to pie grade, requirements on general quality, uniformity in size, freedom from blemishes, sugar strength of sirup, number of halves to can, packing box construction, in conformity with Federal food and drugs act.

References.—Fresh peaches, dried peaches. *See* 132.44, 133.44. Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.45 Canned Plums and Prunes

American Hospital Assn. Bulletin No. 35; 1923. Canned Fruits. Includes specifications of National Canners Assn. Includes plums, definition of grades, number of pieces per can, per cent of sugar in sirup, and description of the fruit.

Assn. of New York State Canners (Inc.). New York Canned Fruits; 1923. Plums. Requirements on percentage of sugar in sirup, maturity, uniformity in size, freedom from blemishes, etc., for 4 grades.

Canners League of California. California Canned Fruits. 1928. Plums. Requirements on percentage of sugar in sirup, freedom from blemishes, size, uniformity, etc., for 4 grades.

Canners League of California. California Canned Fruits; 1928. Prepared Prunes in Sirup. For canned dried prunes, requirements on general quality and appearance, uniformity of count per can, percentage of sugar in sirup, drained weight 30 days after packing.

Michigan Canners Assn. Michigan Canned Fruits; 1923. Plums. For 3 grades, general requirements on quality, maturity, uniformity in size and color, freedom from blemish, sweetness, required strength of sirup in each grade.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Fresh Prunes (canned). For 5 grades, requirements on strength of sirup, general quality and uniformity of fruit, count.

Northwest Canners Assn. Canned Fruits and Vegetables; 1926. Plums; Green Gage Plums; Yellow Egg Plums. For 5 grades of each, requirements on strength of sirup, general quality and uniformity of fruit, count per can.

U. S. Gov., Federal Specifications Board. Z–P–491; 1931. Canned Plums. Green gage, yellow egg, Washington, and Damson varieties. For 4 quality grades, requirements on general quality and uniformity of size, sugar strength of sirup, freedom from blemished and damaged fruit, in conformity with Federal food and drugs act.

U. S. Gov., Federal Specifications Board. Z–P–671; 1931. Canned Prunes. Covers Santa Clara type and Italian type in 2 quality grades, requirements on general quality, freedom from dirt, etc., sugar strength of sirup, standard sizes, drained weight of can contents, fill of can, construction of packing boxes, in conformity with Federal food and drugs act.

References.—Fresh plums and prunes, dried prunes. *See* 132.45, 133.45. Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.5 JAMS, FRUIT BUTTERS, ETC.

134.51 Fruit Butter

National Preservers Assn. Definitions and Standards of Fruit Jams, Preserves, Jellies (included in House Bill H. R. 12693, 70th Congress, April 4, 1928). For apple butter, definition of, method of preparation, minimum percentage of water soluble solids, maximum percentage of sugar to fresh whole apples.

U. S. Gov., Federal Specifications Board. Z–A–616; 1931. Apple Butter. Requirements on general quality of apples used, preparation and general quality of product, freedom from skin, core, seed, dirt, and chemical preservative, permissible mold, to conform to Federal food and drugs act, methods of chemical analysis as prescribed by Assn. of Official Agricultural Chemists.

References.—Methods of analysis, grading regulations, food laws. *See* 130, 120. Fruit jams made from stone fruits. *See* 134.52.

134.52 Jams

National Preservers Assn. Definitions and Standards of Fruit Jams, Preserves, Jellies (included in House Bill H. R. 12693, 70th Congress, April 4, 1928). Includes definitions of fruit jam, fruit and pectin jam, pectin and fruit jam, jam like product, and imitation, required proportions of fruit and sugar and percentage of fruit in final product of each grade, general method of preparation.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev.2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Glucose Fruit Jam, Corn Sirup Fruit Jam. Definitions, required ratio of fruit to glucose or to corn sirup.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Jam, Fruit Jam. Definition, required ratio of fruit to sugar.

U. S. Gov., Federal Specifications Board. Z–J–71; 1931. Fruit Jams. For jam prepared from fresh or cold packed fruit and sugar and cooked to heavy consistency with use of canned fruit acceptable for stone fruit jams, requirements on percentage of fruit and sugar, permissible added pectin or fruit acid, required soluble solids, freedom from artificial coloring and chemical preservatives, general quality of product, in conformity with Federal food and drugs act.

References.—Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.53 Jellies

National Preservers Assn. Definitions and Standards of Fruit Jams, Preserves, Jellies (included in House Bill H. R. 12693, 70th Congress, April 4, 1928). Includes definitions of fruit jelly, pectin jelly, pectin and fruit jelly, and imitation fruit jelly, method of preparation, for fruit jelly the required ratio of fruit juice to sugar and required proportion of water soluble solids.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Glucose Fruit Jelly, Corn Sirup Fruit Jelly. Definition of jelly made from fruit juice or water extract and glucose or corn sirup.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Jelly, Fruit Jelly. Definition of jelly made from fruit juice or water extract and sugar.

U. S. Gov., Federal Specifications Board, Z–J–191; 1931. Fruit jellies. For jelly prepared from fruit juice or water extract and sugar, requirements on general quality, freedom from crystallization, solid suspended matter, dirt, etc., permissible added pectin or fruit acid, required content of soluble solids, in conformity with Federal food and drugs act.

References.—Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.54 Marmalades

U. S. Govt., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Citrus Fruit Marmalade. Definition, kinds of materials cooked with water and sugar.

References.—Citrus fruits. *See* 131.2. Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.55 Fruit Preserves

National Preservers Assn. Definitions and Standards of Fruit Jams, Preserves, Jellies, (included in House Bill H. R. 12693, 70th Congress, April 4, 1928). Includes definition of fruit preserve, fruit and pectin preserve, pectin and fruit preserve, preserve like product, and imitation preserve, required proportions of fruit and sugar and percentage of fruit in final product in each grade, preparation.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Glucose Fruit Preserve and Corn Sirup Fruit Preserve. Definitions, required ratio of fruit to glucose or to corn sirup.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Preserve, Fruit Preserve. Definition, required ratio of fruit sugar.

U. S. Gov., Federal Specifications Board. Z–P–631; 1931. Fruit Preserves. Prepared from matured whole fresh or cold-pack fruit of a single variety and sugar, requirements on percentages of fruit and of sugar, general quality of fruit used, freedom from artificial coloring and chemical preservatives, permissible added pectin or fruit acid, required content of soluble solids in product, in conformity with Federal food and drugs act.

References.—Methods of analysis, grading regulations, food laws. *See* 130, 120.

134.56 Fruit Salads and Sauces

Canners League of California. California Canned Fruits; 1928. Choice Fruits for Salad. To consist of apricots, bartlett pears, yellow cling peaches, pineapple, maraschino cherries, requirements on general quality of fruit, preparation, proportions of varieties, drained weight, count, cut-out density of sirup.

Canners League of California. California Canned Fruits; 1928. Fancy Fruits for Salad. To consist of apricots, bartlett pears, yellow cling peaches, pineapple, and maraschino cherries, requirements on general quality of fruit, preparation, proportions of varieties, drained weight, count, cut-out density of sirup.

References.—Sugar and liquor solutions as fruit sauces. *See* 130. Methods of analysis, grading regulations, fool laws. *See* 130, 120.

135. NUTS

135.1 ALMONDS AND ALMOND PASTE

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Almond Paste. Definition of paste made from sweet and bitter almonds, permissible percentage of water and of sugar.

U. S. Gov., Federal Specifications Board. Y–N–711; 1930. Nuts, Assorted and Mixed. Almonds. Requirements on general quality, freedom from insect attack, percentage of edible kernels, permissible amount of off-variety, acceptable sizes and varieties.

References.—Almond Extract. *See* 175.1.

135.2 CHESTNUTS

Northern Nut Growers Assn. Test Sheet. Undated. Test sheet for entering results from tests on nuts in contests, such as weight, cracking pressure, weight of kernel, etc., with weighted multipliers for each value, such as form, color, thinness of shell, cracking quality, color, and quality of kernel, etc., for judging hickory nuts, walnuts, butternuts, chestnuts, etc.

135.3 COCOANUTS AND SHREDDED COCOANUT

U. S. Gov., Federal Specifications Board. Z–C–571; 1930. Prepared Coconut. For long shred, medium shred, or short shred types, shredded without the removal of oil, requirements on preparation, and total coconut content, methods of test as specified by Assn. of Official Agr. Chemists.

References.—Coconut oil meal. *See* 112.4. Methods of analysis, grading regulations, food laws. *See* 120.

135.4 FILBERTS

U. S. Gov., Federal Specifications Board. Y–N–711; 1930. Nuts, Assorted and Mixed. Filberts. Requirements on general quality, freedom from defects, percentage of edible kernels, varieties acceptable.

135.5 PEANUTS AND PEANUT BUTTER

National Cottonseed Products Assn. Rules; 1930. Rules 45, 46, and 47. Peanuts. Definitions of 3 grades of unshelled peanuts, permissible dirt, stems, trash, etc., and required percentage of moisture.

National Peanut Products Assn. Peanut Butter; 1925. Definitions of 3 standard grades, including grade of peanut used and freedom from mold and foreign matter.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Grades for Shelled Runner Peanuts; 1925. Permissive standards, definitions of 2 grades as regards permissibility of split or broken peanuts, freedom from shriveled, unshelled, or damaged peanuts and foreign material.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Grades for Shelled White Spanish Peanuts; 1925. Permissive standards, definitions of 2 grades as regards requirements for whole or split peanuts, freedom from shriveled, discolored, unshelled, damaged peanuts, and foreign material.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Farmers Stock Runner Peanuts; 1931. Not applicable to Virginia type runner peanuts. Definitions of 4 grades of unshelled runner peanuts including required percentage of sound and mature kernels and permissible damaged kernels.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standard for Farmers' Stock Virginia Type Peanuts; 1929. Permissive standards, definitions of 5 grades of unshelled peanuts as regards maturity, dryness, freedom from foreign material, percentages of certain sizes, kernel quality classes included, definitions of 3 quality grades as regards percentages of sound and mature kernels, and definitions of 3 size grades.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Farmers Stock White Spanish Peanuts; 1928. Permissive standards, definitions of 4 grades of unshelled peanuts as regards maturity, dryness, freedom from damage, percentage of sound and mature kernels.

U. S. Gov., Federal Specifications Board. Z–P–196; 1931. Peanut Butter. To conform to Federal food and drugs act, to produce a smooth moist butter without separation of oil, to have a good flavor.

References.—Pressed peanuts, peanut meal, peanut oil cake. *See* 112.2. Methods of analysis, grading regulations, food laws. *See* 120. Peanut oil. *See* 142.6.

135.6 PECANS

National Pecan Assn. Pecan Grades and Standards; 1926. Size definitions of 3 standard size grades for long nuts and for round nuts, definitions of 3 quality grades as regards cleanliness, color and percentage of perfect kernels.

National Pecan Growers Exchange. Pecan Grade Standards. Undated. Definitions of size grades for 4 grades of long type nuts and for 4 grades of other types.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Unshelled Pecans: 1930. A permissive standard definitions of 3 grades as regards uniformity of color, tightness of shell, dryness, permissible kinds and amounts of defects for shells and for kernels, diameter requirements for size classification.

U. S. Gov., Federal Specifications Board. Y–N–711; 1930. Nuts, Assorted and Mixed. Pecans. Requirements on general quality, freedom from defects, percentage of edible kernels, varieties acceptable.

135.7 WALNUTS

California Walnut Growers Assn. Standards of Marketing; 1926. Sales contract for 1926 season covers requirements for grade sizes, percentage edible kernels, percentage of light colored kernels, and appearance of shell, color chart for determination of color of kernel, for two quality grades.

Northern Nut Growers Assn. Test Sheet. Undated. Test sheet for entering results from tests on nuts in contests, such as weight, cracking pressure, weight of kernel, etc., with weighted multipliers for each value, such as form, color, thinness of shell, cracking quality, color and quality of kernel, etc., for judging of hickory nuts, walnuts, butternuts, chestnuts, etc.

U. S. Gov., Federal Specifications Board. Y–N–711; 1930. Nuts, Assorted and Mixed. English walnuts. Requirements on general quality and freedom from defects, percentage of edible kernels and of light colored kernels, acceptable sizes and varieties.

135.8 MIXED NUTS

U. S. Gov., Federal Specifications Board. Y–N–711; 1930. Nuts, Assorted and Mixed. Mixed Nuts. Requirements on kinds of nuts, their proportions in the mixture, varieties, general qualities for each variety, required percentage of edible kernels for each variety.

135.9 MISCELLANEOUS NUTS AND NUT PRODUCTS

Northern Nut Growers Assn. Test Sheet. Undated. Test sheet for entering results from tests on nuts in contests, such as weight, cracking pressure, weight of kernel, etc., with weighted multipliers for each value, such as form, color, thinness of shell, cracking quality, color and quality of kernel, etc., for judging of hickory nuts, walnuts, butternuts, chestnuts, etc.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Kernel Pastes. For apricot, peach, plum, and prune kernel pastes, definition, requirements on freedom from hydrocyanic acid, permissible percentage of water and of sugar.

U. S. Gov., Federal Specifications Board. Y–N–711; 1930. Nuts, Assorted and Mixed. Brazil nuts. Requirements on general quality, freedom from moldy and defective nuts, percentage of edible kernels, number of nuts to pound.

References.—Methods of analysis, inspection and grading regulations, food laws. *See* 120.

140–149 OIL SEEDS AND VEGETABLE OILS AND FATS

141. OILSEEDS

American Oil Chemists' Society. Methods of Chemical Analysis; 1930. Cotton Seed. Requirements on sampling, determination of original moisture and of moisture after fuming, determination of oil and of free fatty acid.

American Oil Chemists' Society. Methods of Chemical Analysis; 1930. Cottonseed Hulls. Requirements on sampling, determination of oil, lint, and calculated cellulose.

National Cottonseed Products Assn. Rules; 1930. Rule 40, Cottonseed. For basis cottonseed requirements on coolness and lack of treatment, percentages of oil, ammonia, foreign matter, and free fatty acid, method for determination of index relation of a given shipment to the basis cottonseed.

National Cottonseed Products Assn. Rules; 1930. Rules 125 to 127. Cottonseed Hulls. Definitions of 2 grades.

National Cottonseed Products Assn. Rules; 1930. Rules 240 and 270. Cottonseed. Methods of sampling from various conveyances, methods of chemical analysis for determination of moisture, moisture of fumed sample, oil content, nitrogen, and free fatty acid.

National Cottonseed Products Assn. Rules; 1930. Rule 271. Cottonseed Hulls. Method of analysis for determination of oil and of lint.

References.—Peanuts. *See* 135.5. Cottonseed oil cake and meal. *See* 112.3. Cocoa or cacao beans. *See* 151.1.

142. VEGETABLE OILS

142.0 GENERAL ITEMS

American Chemical Society. Standard Methods for the Sampling and Analysis of Commercial Fats and Oils; 1926. Published by American Oil Chemists Society. Applicable to edible fats and oils, methods of sampling, apparatus and methods of determination of moisture, volatile matter, insoluble impurities, soluble mineral matter, fatty acids combined, free fatty acids, titer, saponification number, unsaponifiable matter, iodine number, melting point, softening point, slipping point, flow test, cloud test, bleach test, Reichert-Meissl and Polenske numbers, Kirschner value, index of refraction, specific gravity, acetyl value, open-cup flash and fire test, standard color for commercial fat.

American Oil Chemists' Society. Methods of Chemical Analysis; 1930. Refined Oils. Requirements on structural features of tintometer, method of determining color of oil with Lovibond glasses, determination of total fatty acids of soap stock and acidulated soap stock, determination of titer.

American Society for Testing Materials. D 94–28; 1928. Approved by American Standards Assn. as Z11t–1930. Method of Test for Saponification Number. Useful in identification of unmixed animal and vegetable oils and for measuring quantity of fatty material in compounded products, apparatus and preparation of reagents, test procedure for saponification number and percentage of fatty oil.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Oils, Fats, and Waxes. Preparation of sample, determination of specific gravity, index of refraction, melting point, titer test, iodine absorption number, saponification number, soluble and insoluble acids, Kirschner value, free fatty acids, acetyl value, unsaponifiable residue, amount of cottonseed, peanut, and sesame oils, tentative methods for determination of cholesterol and phytosterol, presence of resin oil, detection of fish oils in presence of vegetable oils, detection of coloring matters.

National Cottonseed Products Assn. Rules; 1930. Rules 242 and 273. Crude Vegetable Oils. Methods of sampling from tanks and tank cars, methods of chemical analysis for determination of moisture or volatile matter, meal or impurities, and free fatty acids, method of refining and preparation of sodium hydroxide solutions for determination of refining loss, tentative method for refining crude peanut oil, crude cocoanut oil, soyabean oil, corn-oil.

National Cottonseed Products Assn. Rules; 1930. Rules 242 and 275. Refined Oils. Methods of sampling from tanks and tank cars, methods of chemical analysis for determination of color, bleaching, cold test, free fatty acids.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Edible Vegetable Oils and Fats. Definition, used in enforcement of Federal food and drugs act.

References.—Lovibond glasses for color determinations. *See* 914.6.

142.1 COCOANUT OIL

American Oil Chemists Society. Official Methods of Chemical Analysis; 1930. Includes cocoanut oil, apparatus and methods of determination of color and refining loss for crude oils, and color, bleaching, free fatty acids, and cold test for refined oil.

National Cottonseed Products Assn. Rules; 1930. Rules 80 to 83. Crude Cocoanut Oil. Definitions of 3 grades and of basis prime grade as regards freedom from impurities, permissible content of free fatty acid, color requirements, for the pressed oil.

National Cottonseed Products Assn. Rules; 1930. Rules 84 and 85. Refined Cocoanut Oil. Definitions of 2 grades as regards freedom from moisture and impurities, permissible content of free fatty acids, permissible darkness of color.

New York Produce Exchange. Rules of Transactions in Vegetable Oils, Waxes and Fats; 1924. Cocoanut Oil. For 8 grades of expressed oil, requirements on allowable percentages of free fatty acids, moisture and impurities, color test with standard glasses.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Coconut Oil or Copra Oil. Definition as to source. Cochin Oil is coconut oil prepared in Cochin (Malabar). Ceylon Oil is coconut oil prepared in Ceylon.

References.—Cocoanut oil cake, shredded cocoanut. *See* 112.4, 135.3. Methods of analysis. *See* also 142.0.

142.2 CASTOR OIL

References.—Castor oil, medicinal. *See* 813.1. Methods of analysis, food laws. *See* 142.0, 120.

142.3 CORN OIL

American Oil Chemists' Society. Methods of Chemical Analysis; 1930. Crude Corn Oil. Tentative method for refining determination with strength of lye specified.

New York Produce Exchange. Rules of Transactions in Vegetable Oils, Waxes and Fats; 1924. Corn Oil. For 5 grades of expressed oil, requirements on allowable percentage of free fatty acids, flavor, odor, freedom from moisture and impurities, refining loss, and color test.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Corn Oil or Maize Oil. Definition as to source.

References.—Methods of analysis, food laws. *See* 142.0, 120. Corn, corn oil cake. *See* 103.1, 112.9.

142.4 COTTONSEED OIL

American Oil Chemists' Society. Official Methods of Chemical Analysis; 1930. Includes cottonseed oil, apparatus and methods of determination of color and refining loss for crude oils, and color bleaching, free fatty acids, and cold test for refined oil.

National Cottonseed Products Assn. Rules; 1930. Rules 50 to 57. Crude Cottonseed Oil. Definitions of 5 grades as regards color of refined oil produced therefrom and permissible loss in refining, definitions of 4 grades of cold pressed oil, definition of slow breaking oil.

National Cottonseed Products Assn. Rules; 1930. Rules 60 to 68. Refined Cottonseed Oil. Definitions of 9 grades, including color requirements and permissible amount of free fatty acid.

New York Produce Exchange. Rules Regulating Transactions in Cottonseed Products; 1922. Rule 19. Crude cottonseed oil, definitions of 4 grades as regards soundness of seed, freedom from water and settlings, loss on refining, and ability to produce prime summer yellow oil using test methods of National Cottonseed Products Assn.

New York Produce Exchange. Rules Regulating Transactions in Cottonseed Products; 1922. Rule 22. Refined cottonseed oil, definitions of 9 grades of summer and winter, yellow and white oils, as regards clearness, freedom from water and settlings, flavor, odor, Lovibond color test, allowable free fatty acids, using test methods of National Cottonseed Products Assn.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Cottonseed Oil. Definition as to source.

References.—Cottonseed oil for medicinal purposes. *See also* 813.3. Cottonseed, cottonseed oil cake and meal. *See* 141., 112.3. Vegetable shortening. *See* 142.95. Methods of analysis, food laws. *See* 142.0, 120. Cottonseed salad oil. *See* 142.94.

142.5 OLIVE AND PALM OILS

New York Produce Exchange. Rules of Transactions in Vegetable Oils, Waxes and Fats; 1924. Olive Oil. For commercial grade of olive oil, requirements on allowable percentage of moisture and sediment and of free fatty acids, color. For olive oil foots of sulphur olive oil, extracted by bisulphide of carbon, requirements on allowable moisture and impurities, color test.

New York Produce Exchange. Rules of Transactions in Vegetable Oils, Waxes and Fats; 1924. Palm Oil. Permissible percentage of dirt and water.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Olive Oil, or Sweet Oil. Definition as to source.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Palm Kernel Oil. Definition as to source.

U. S. Gov., Federal Specifications Board. Z-O-351; 1931. Olive Oil, Edible Grade. For cold pressed olive oil clarified by mechanical means only, requirements on general quality, color, freedom from rancidity, specific gravity, iodine number, construction of packing boxes, in conformity with Federal food and drugs act.

References.—Olive oil for medicinal purposes. *See also* 813.6. Methods of analysis, food laws. *See* 142.0, 120.

142.6 PEANUT OIL

American Oil Chemists' Society. Methods of Chemical Analysis; 1930. Tentative Method of Refining Crude Peanut Oil. Required procedure and number of refinings, with strength of lye required for oils with various contents of free fatty acids.

National Cottonseed Products Assn. Rules; 1930. Rules 70 to 72. Crude Peanut Oil. Definitions of 3 grades and of basis prime crude grade, as regards freedom from water and foreign matter, grade of refined oil obtainable and permissible loss in weight on refining.

National Cottonseed Products Assn. Rules; 1930. Rules 73 to 75. Refined Peanut Oil. Definitions of 3 grades as regards color requirements and permissible content of free fatty acid.

New York Produce Exchange. Rules of Transactions in Vegetable Oils, Waxes and Fats; 1924. Peanut Oil. For 5 grades of expressed oil, requirements on freedom from moisture and impurities, color test, loss on refining, allowable free fatty acids, etc.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2. Rev. 2: 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Peanut Oil, or Arachis Oil, or Earthnut Oil. Definition as to source.

References.—Peanuts, peanut oil cake and meal. *See* 135.5, 112.2. Methods of analysis, food laws. *See also* 142.0, 120.

142.7 POPPY SEED AND SUNFLOWER OILS

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2: 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Poppy Seed Oil. Definition as to source.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sunflower Oil. Definition as to source.

References.—Methods of analysis, food laws. *See* 142.0. 120.

142.8 RAPESEED AND SESAME OILS

New York Produce Exchange. Rules of Transactions in Vegetable Oils, Waxes and Fats; 1924. Rapeseed Oil. For 3 grades of expressed oil, refined and semirefined, permissible percentages of free fatty acids and of moisture and impurities.

New York Produce Exchange. Rules of Transactions in Vegetable Oils, Waxes and Fats; 1924. Sesame Oil. For hot pressed or cold pressed oil, permissible percentages of moisture and impurities and of free fatty acids.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Rapeseed Oil, or Rape Oil, or Colza Oil. Definition as to source.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sesame Oil, or Gingilli Oil, or Teel Oil, or Benne Oil. Definition as to source.

References.—Sesame oil for medicinal purposes. *See also* 813.7. Methods of analysis, food laws. *See* 142.0, 120.

142.9 MISCELLANEOUS SPECIFICATIONS FOR VEGETABLE OIL

142.91 Oleomargarine, Nut Margarine

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Renovated Butter and Oleomargarine. Tentative tests by foam test and melted fat test to distinguish from true butter.

U. S. Gov., Congress. Stat. Public No. 540; 1930. Amendment to act defining butter. Taxing and Regulating Oleomargarine of 1886. Requires that all substances made in imitation of butter, or intended to be sold as butter, or churned or mixed with cream, milk, water, shall be known and designated as "oleomargarine."

U. S. Gov., Federal Specifications Board. 381a; 1927. Dairy Products. Oleomargarine. Requirements on ingredients used in manufacture including permissible amount of vegetable oil, general quality, content of salt and of moisture, quality score of butter used, butter fat content, methods of test as specified by Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food laws. *See also* 142.0, 120.

142.92 Vegetable Tallow

New York Produce Exchange. Rules of Transactions in Vegetable Oils, Waxes and Fats; 1924. Chinese Vegetable Tallow. Requirements on titre and permissible moisture and impurities.

References.—Methods of analysis, food laws. *See* 142.0, 120.

142.93 Cacao Butter

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Cacao Butter, or Cocoa Butter. Definition, source.

References.—Cacao butter, medicinal. *See* 813.8.

142.94 Salad Oil and Mayonnaise

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Salad Dressings. Tentative Methods. Preparation of sample, determination of total solids, reducing sugars, sucrose, total acid, oil, identification of oil, lecithin phosphoric acid, and egg solids.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Mayonnaise. Definition, including materials entering into its composition, required percentage of edible vegetable oil and sum of percentages of oil and egg yolk.

U. S. Gov., Federal Specifications Board. EE–D–691; 1931. Salad Dressing. For mayonnaise and for all other varieties, requirements on freedom from artificial coloring, preservatives, adulterants, and impurities, to conform to Federal food and drugs act. For mayonnaise, mayonnaise dressing, and mayonnaise salad dressing, requirements on ingredients, general quality, percentages of vegetable oil and of egg yolk, test methods of Assn. of Official Agri. Chemists.

U. S. Gov., Federal Specifications Board. JJJ–O–361; 1930. Vegetable Salad Oil. For 2 types, any edible vegetable oil except olive oil, any designated type of edible vegetable oil except olive oil, requirements on general quality, freedom from rancidity, 5-hour cold test, conforming to requirements of Federal food and drugs act, specifications for packing boxes.

References.—Methods of analysis, food laws. *See* 142.0, 120.

142.95 Vegetable Shortening

U. S. Gov., Specifications Board. EE–L–101; 1931. Lard Substitutes (Including Vegetable Shortening). Includes one type derived from vegetable origin only, requirements on use of pure vegetable oil or vegetable oil stearin or hydrogenated vegetable oil, solidity of product, freedom of product from rancidity, foreign odor, animal fats, or water.

References.—Methods of analysis, food laws. *See* 142.0, 120. Cottonseed oil. *See* 142.4.

142.96 Lavender Oil

References.—Lavender oil, medicinal. *See* 813.9.

142.97 Lemon and Orange Oils

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Lemon and Orange Oils. Determination of specific gravity, index of refraction, optical rotation, aldehydes, physical constants of distillate, pinene.

References.—Lemon oil and orange oil for medicinal purposes. *See* 813.9.

142.99 Miscellaneous Vegetable Oils

References.—China wood oil. *See* 848.2. Perilla oil. *See* 848.4. Linseed and soybean oils. *See* 143.

143. LINSEED AND SOYBEAN OILS

143.1 LINSEED OIL

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 51. Finish and Sizing for Organdies. Method of preparation from whole flax seed, required constituents and amounts of each.

References.—Linseed oil for medicinal purposes. *See* 813.5. Linseed oil for paint. *See* 848.11, 848.12.

143.2 SOYBEAN OIL

American Oil Chemists' Society. Methods of Chemical Analysis; 1930. Crude Soybean Oil. Tentative method for refining determination with strength of lye specified.

American Society for Testing Materials. Tentative Specifications. D 124–22T; 1922. Soybean Oil, Raw or Refined. Preparation of reagents, limiting values and test procedure for foots, loss on heating, specific gravity, acid number, saponification number, iodine number, unsaponifiable matter, and color.

National Cottonseed Products Assn. Rules; 1930. Rules 76, 77. Crude Soybean Oil. Definitions of 2 grades of pressed oil as regards freedom from impurities, color of refined oil produced therefrom, and permissible loss in refining.

National Soybean Oil Mfrs. Assn. Purity and Quality of Crude Domestic Raw Soybean Oil; 1930. For oil delivered under trading rules of N. S. O. M. A., requirements on specific gravity, iodine number, saponification number, unsaponifiable matter, permissible free fatty acid, volatile matter, and foots, methods of analysis to be those given in D124–22T of Am. Soc. for Testing Materials.

New York Produce Exchange. Rules of Transactions in Vegetable Oils, Waxes, and Fats; 1924. Soybean Oil. For expressed oil, requirements on freedom from impurities and moisture, allowable free fatty acids, color test with standard glasses, for crude, refined, prime, and deodorized grades. For extracted oil, requirements on allowable amounts of free fatty acids, water, and moisture.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Soybean Oil, or Soy Oil, or Soja Oil. Definition as to source.

References.—Methods of analysis. *See also* 142.0.

150–159 COCOA, COFFEE, TEA, SPICES, AND LEAVENING AGENTS

151. COCOA

151.0 GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Cacao Bean and Its Products. Preparation of sample, determination of moisture, ash, alkalinity of ash, nitrogen, fat, testing of fat for melting point, index of refraction, iodine number, saponification number, etc., and tentative methods for determination of casein, crude fiber, starch, sucrose, milk fat in milk chocolate.

151.1 COCOA OR CACAO BEANS

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Cacao Beans, or Cocoa Beans. Definition as to source.

References.—Methods of analysis. *See* 151.0.

151.2 COCOA, POWDERED OR PREPARED

American Pharmaceutical Assn. National Formulary; 1926. Cocoa. For medicinal purposes, description and physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. "Breakfast Cocoa." Definition, required percentage of cacao fat.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Cocoa, Powdered Cocoa. Definition, permissible percentages of crude fiber, total ash, and ash insoluble in hydrochloric acid.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs drugs act. Dutch-Process Cocoa, "Alkalized Cocoa." Definition, permissible percentage of potassium carbonate.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sweet Milk Cocoa. Definition, required percentage of milk solids.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sweet or Sweetened Cocoa. Definition, permissible percentages of sugar, crude fiber, total ash, and ash insoluble in hydrochloric acid.

U. S. Gov., Federal Specifications Board. JJJ–C–501; 1931. Cocoa. For pulverized breakfast cocoa and dutch process cocoa, in conformity with food and drugs act, requirements on percentages of cocoa fat, total ash, ash insoluble in hydrochloric acid, and crude fiber, analyses according to methods of Assn. of Official Agriculture Chemists.

References.—Chocolate. *See* 151.3. Methods of analysis, food regulations. *See* also 151.0, 120.

151.3 CHOCOLATE, POWDERED OR PREPARED

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Chocolate, Plain Chocolate, Bitter Chocolate, Chocolate Liquor, Chocolate Paste, Bitter Chocolate Coating. Definitions, required percentage of cacao fat, permissible percentages of crude fiber, ash, and ash insoluble in hydrochloric acid.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A.. F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Dutch-Process Chocolate, "Alkalized Chocolate." Definition, permissible percentage of potassium carbonate.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Milk Chocolate. Definition, required percentage of milk solids.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sweet Chocolate. Definition, permissible percentages of crude fiber, total ash, and ash insoluble in hydrochloric acid.

U. S. Gov., Federal Specifications Board. JJJ–C–271; 1931. Chocolate. For plain chocolate, and sweetened vanilla chocolate, in conformity with Federal food and drugs act, requirements on percentages of cacao fat, total ash, ash insoluble in hydrochloric acid, and crude fiber, chemical analyses in accordance with methods of Assn. of Official Agricultural Chemists.

References.—Cocoa. *See* 151.1, 151.2. Methods of analysis, food regulations. *See* 151.0, 120.

152. COFFEE

152.0 GENERAL ITEMS

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Coffee. General definition of coffee, green, raw, unroasted, and roasted.

152.1 COFFEE, RAW OR GREEN

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Green Coffee. Tentative methods for macroscopic examination and for identification of coloring matters.

U. S. Gov., Federal Specifications Board. HHH–C–571; 1931. Coffee. Includes green coffee of 2 grades, one equal to Santos No. 4 and the other to Rio grade No. 4 of the New York Coffee and Sugar Exchange standards, requirements on general quality, in conformity with Federal food and drugs act.

References.—Definitions of coffee, food laws. *See* 152.0. 120.

152.2 COFFEE, ROASTED

American Pharmaceutical Assn. National Formulary; 1926. Coffee. Roasted coffee for medicinal purposes, description and physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Roasted Coffee. Preparation of sample, determination of ash, alkalinity of ash, phosphoric acid in ash, chlorides, caffeine, crude fiber, ether extract, and tentative methods for determination of macroscopic properties, moisture, soluble solids, starch, sugars, acidity, coating substances of sugar, egg, chicory, waxes.

U. S. Gov., Federal Specifications Board. HHH–C–571; 1931. Coffee. Includes roasted coffee, whole bean or ground, one grade equal to Santos No. 4 and one grade equal to Rio grade No. 4 of the New York Coffee and Sugar Exchange standards, requirements on general quality for 1 quality grade of bean coffee and 2 quality grades of ground coffee, in conformity with Federal food and drugs act.

References.—Definitions of coffee, food laws. *See* 152.0. 120.

152.3 COFFEE SUBSTITUTES AND EXTRACT

153. TEA

153.0 GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Tea. Preparation of sample, determination of moisture, water extract, ash, alkalinity of ash, phosphoric acid in ash, ether extract, crude fiber, caffeine, and tentative methods for determination of protein, volatile oil, tannin, paraffin and waxy substances, pigments used for coloring or facing.

U. S. Gov., Congress. 29 Stat. at L. p. 604, 1897 as amended. (For text see S. R. A., T. No. 1. 1928 of Food, Drug, and Insecticide Administration of Dept. of Agriculture.) The tea act. Authorizes Sec. of Agriculture to appoint a board each year which shall submit standard samples of tea, the Sec. to establish standards of purity, quality, and fitness for consumption, and to deposit duplicate standard samples at ports of entry, etc., only tea conforming to standards to be allowed entry.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., T. No. 1; 1928. Regulations for the enforcement of the tea act. Includes regulations on preparation of standards by board of tea experts, period when such standards take effect, rules for testing teas for quality, impurities, coloring matter, in comparison with standards, permissible amounts of specified screen sizes of dust for various teas, regulations regarding rejection, etc.

153.1 TEA

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Tea. Definition, source, limits on percentage of ash, meets act of Congress of Mar. 2, 1897, regulating the importation and inspection of tea.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., T. No. 5; 1931. Standards under the tea act. (Effective May 1, 1930.) A list of the 7 standards for tea submitted by board of tea experts and established as standards under tea act, includes Formosa used for Foochow and Canton Oolong, Congou; Java used for all fully fermented East India teas; Gunpowder, green used for all China green teas; Japan; scented orange pekoe; and scented Canton.

U. S. Gov., Federal Specifications Board. HHH–T–191; 1931. Tea. Covers new crop and medium cup quality teas of 4 types, black tea with 5 acceptable varieties, green tea with 2 acceptable varieties, Oolong tea of 1 variety, and blended or mixed teas, conforming to Federal food and drugs act. Requirements on general quality, type of leaf, uniformity of color, freedom from foreign odors, recommended proportions for mixed teas, in accordance with standards recognized by Federal law, the Federal Board of Tea Experts, and the U. S. Dept. of Agriculture.

References.—Methods of analysis, tea laws. *See* 153.0.

154. SPICES, SALT, AND VINEGAR

154.0 GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Spices. Preparation of sample, determination of soluble and insoluble ash, calcium oxide in ash, nitrogen, ether extract, alcohol extract, copper-reducing substances, starch, crude fiber, tannin, sulphur, volatile oils in mustard seed, tentative methods for determination of moisture, cold water extract, olive oil in paprika, and microscopic examination.

154.1 SPICES, BARK AND ROOT TYPE, AND HORSE RADISH

154.11 Cinnamon

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Cinnamon. Definitions of cinnamon, Ceylon cinnamon, and Saigon cinnamon, permissible percentage of total ash and of ash insoluble in hydrochloric acid in ground cinnamon.

U. S. Gov., Federal Specifications Board. EE–S–631; 1930. Spices. Cinnamon, ground. Requirements on source, permissible ash, and ash insoluble in hydrochloric acid, methods of analysis as specified by Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food laws. *See* 154.0, 120. Cinnamon extract. *See* 175.9.

154.12 Ginger

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Ginger. Definitions of ginger, Jamaica ginger, and of limed ginger, required percentages of starch, cold water extract, and ash soluble in cold water, permissible percentages of crude fiber, lime, total ash, and ash insoluble in acid, for each type.

U. S. Gov., Federal Specifications Board. EE–S–631; 1930. Spices. Ginger, ground. Requirements on source, starch content, cold water extract content, and of ash soluble in water, permissible lime, ash, and ash insoluble in hydrochloric acid, methods of analysis as specified by Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food laws. *See* 154.0, 120. Ginger extract. *See* 175.9.

154.13 Horse Radish

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Horse Radish. Definition as to source, prepared horse radish defined as with or without vinegar.

References.—Methods of analysis, food laws. *See* 120.

154.19 Miscellaneous Spices of Bark and Root Type

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Curcuma or Tumeric. Definition as to source.

References.—Methods of analysis, food laws. *See* 154.0, 120.

154.2 SPICES, FRUIT TYPE

154.21 Allspice

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Allspice, or Pimento. Definition, required percentage of quercitannic acid, permissible percentages crude fiber, total ash, and ash insoluble in hydrochloric acid.

U. S. Gov., Federal Specifications Board. EE–S–631; 1930. Spices. Allspice. For ground material, definition, permissible crude fiber, ash, ash insoluble in hydrochloric acid, required content of quercitannic acid, methods of analysis as specified by Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food laws. *See* 154.0, 120.

154.22 Paprika

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Hungarian Paprika. Definitions of rosenpaprika and of koenigspaprika or king's paprika, permissible percentages of nonvolatile ether extract, crude fiber, total ash, and ash insoluble in acid.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Paprika. Definition, permissible percentage of total ash and of ash insoluble in hydrochloric acid, limits on iodine number of extracted oil.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Pimenton, Pimiento, or Spanish Paprika. Definition, permissible percentages of nonvolatile ether extract, crude fiber, total ash, and ash insoluble in acid.

References.—Methods of analysis, food laws. *See* 154.0, 120.

154.23 Pepper

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Black Pepper. Definitions of black pepper and of ground black pepper, required percentages of nonvolatile ether extract and starch, permissible percentages of total ash and of ash insoluble in hydrochloric acid.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Cayenne Pepper. Definition of cayenne or cayenne pepper, required percentage of nonvolatile ether extract, permissible percentages of starch, crude fiber, total ash, and ash insoluble in acid.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Red Pepper. Definition, permissible percentage of total ash and of ash insoluble in hydrochloric acid.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food

Products. Used in enforcement of food and drugs act. White Pepper. Definition, required percentage of nonvolatile ether extract and of starch, permissible percentages of crude fiber, total ash, and ash insoluble in hydrochloric acid.

U. S. Gov., Federal Specifications Board. EE–S–631; 1930. Spices. Black pepper. For ground product, definition, requirements on content of starch, ash, ash insoluble in hydrochloric acid, and nonvolatile ether extract, methods of analysis as specified by Assn. of Official Agri. Chemists.

U. S. Gov., Federal Specifications Board. EE–S–631; 1930. Spices. Cayenne pepper. Definition, requirements on content of nonvolatile ether extract, starch, crude fiber, ash, and ash insoluble in hydrochloric acid, methods of analysis as specified by Assn. of Official Agri. Chemists.

U. S. Gov., Federal Specifications Board. EE–S–631; 1930. Spices. Chili Colorado pepper. For ground pepper, definition, sources from which obtainable.

U. S. Gov., Federal Specifications Board. EE–S–631; 1930. Spices. White ground pepper. Definition, requirements on percentages of nonvolatile ether extract, starch, crude fiber, ash, and of ash insoluble in hydrochloric acid, methods of analysis as given by Assn. of Official Agricultural Chemists.

References.—Fresh peppers. *See* 122.5. Methods of analysis, food laws. *See* 154.0, 120.

154.3 SPICES, FRUIT SEED TYPE

154.31 Anise

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Anise. Definition of anise or aniseed, permissible percentages of total ash and of ash insoluble in hydrochloric acid.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Star Aniseed. Definition, permissible total ash.

References.—Methods of analysis, food laws. *See* 154.0, 120. Anise extract, anise oil. *See* 175.9, 813.9.

154.32 Celery Seed

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Celery Seed. Definition, permissible percentage of total ash and of ash insoluble in hydrochloric acid.

References.—Methods of analysis, food laws. *See* 154.0, 120.

154.33 Coriander Seed

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Coriander Seed. Definition, permissible percentage of total ash and of ash insoluble in hydrochloric acid.

References.—Methods of analysis, food laws. *See* 154.0, 120. Oil of coriander. *See* 813.9.

154.34 Cumin Seed

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Cumin Seed. Definition, permissible percentage of total ash, of ash insoluble in hydrochloric acid, and of foreign matter.

References.—Methods of analysis, food laws. *See* 154.0, 120.

154.35 Dill Seed

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Dill Seed. Definition, permissible percentage of total ash and of ash insoluble in hydrochloric acid.

References.—Methods of analysis, food laws. *See* 154.0, 120.

154.36 Fennel Seed

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Fennel Seed. Definition, permissible percentage of total ash and of ash insoluble in hydrochloric acid.

References.—Methods of analysis, food laws. *See* 154.0, 120. Fennel oil for medicinal purposes. *See* 813.9.

154.4 SPICES, LEAF TYPE

154.41 Capers

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Capers. Defined as flower buds of capparis spinosa.

References.—Methods of analysis, food laws. *See* 154.0, 120.

154.42 Cloves

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Cloves. Definition, permissible percentage of clove stems, of crude fiber, of total ash, and of ash insoluble in acid, required percentage of volatile ether extract, and of quercitannic acid.

U. S. Gov., Federal Specifications Board. EE–S–631; 1930. Spices. Cloves, ground and whole. Requirements on content of quercitannic acid and of volatile ether extract, permissible stems, crude fiber, ash, and ash insoluble in hydrochloric acid, methods of analysis as specified by Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food laws. *See* 154.0, 120. Clove extract, oil of cloves. *See* 175.9, 813.9.

154.43 Marjoram

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2. Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Marjoram. Definition of marjoram or leaf marjoram, permissible percentages of stems and foreign material, total ash, and ash insoluble in hydrochloric acid.

References.—Methods of analysis, food laws. *See* 154.0, 120.

154.44 Sage

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sage. Definition, permissible amount of stems and foreign material.

U. S. Gov., Federal Specifications Board. EE-S-631; 1930. Spices. Sage. Requirements on source, content of volatile ether extract, permissible crude fiber, methods of analysis as specified by Assn. of Official Agri. Chemists.

References.—Methods of analysis, food laws. *See* 154.0, 120.

154.45 Thyme

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Thyme. Definition, permissible percentage of total ash and of ash insoluble in hydrochloric acid.

U. S. Gov., Federal Specifications Board. EE-S-631; 1930. Spices. Thyme. Requirements on source, permissible ash and ash insoluble in hydrochloric acid, methods of analysis as specified by Assn. of Official Agri. Chemists.

References.—Methods of analysis. food laws.—*See* 154.0, 120.

154.49 Miscellaneous Leaf Type Spices

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Savory. General definition.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Tarragon. General definition.

154.5 SPICES, SEED TYPE

154.51 Cardamom

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Cardamom seed. Definition, permissible percentage of ash and of ash insoluble in hydrochloric acid.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Cardamom. Defined as the dried, nearly ripe fruit of elettaria cardamomum.

References.—Methods of analysis, food laws. *See* 154.0, 120. Oil of cardamom. *See* 813.9.

154.52 Caraway

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Caraway. Definition of caraway or caraway seed, permissible percentage of total ash and of ash insoluble in hydrochloric acid.

References.—Methods of analysis, food laws. *See* 154.0, 120. Oil of caraway. *See* 813.9.

154.53 Mace

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Mace. Definition, limiting amounts of nonvolatile ether extract, permissible percentages of crude fiber, total ash, and of ash insoluble in hydrochloric acid.

U. S. Gov., Federal Specifications Board. EE-S-631; 1930. Spices. Mace. Definition, requirements on content of nonvolatile ether extract, permissible fiber, ash, and ash insoluble in hydrochloric acid, methods of analysis as given by Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food laws. *See* 154.0, 120.

154.54 Mustard

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Prepared Mustard. Preparation of sample, determination of solids, ash, salt, protein, acidity, copper reducing substances, crude fiber, preservatives, and tentative methods for determination of ether extract, and coloring matter.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Mustard. Prepared mustard, definition, required percentage of nitrogen, permissible percentages of carbohydrates and crude fiber. Mustard flour, definition, permissible percentages of starch and ash. Mustard cake and ground mustard, definitions. Mustard seed, definitions, required yield of mustard oil, permissible percentage of total ash and of ash insoluble in hydrochloric acid, for several varieties.

U. S. Gov., Federal Specifications Board. EE-M-821; 1931. Prepared Mustard. For 1 type and grade including yellow (English) style, dard (German) style, and French style, requirements on preparation and allowed species of seed, content of carbohydrates, crude fiber, and nitrogen, consistency of product, in conformity with Federal food and drugs act, chemical analysis according to methods of Assn. of Official Agricultural Chemists.

U. S. Gov., Federal Specifications Board. EE-S-631; 1930. Spices. Mustard, ground. Definition, requirements on freedom from excessive hulls, permissible starch and ash, methods of analysis as specified by Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food laws. *See also* 154.0, 120. Oil of mustard. *See* 813.9.

154.55 Nutmeg

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Nutmeg. Definition, required percentage of nonvolatile ether extract, permissible percentages of crude fiber, total ash, and of ash insoluble in hydrochloric acid.

U. S. Gov., Federal Specifications Board. EE-S-631; 1930. Spices. Nutmeg. For whole seed and for ground material, definition and general quality, requirements on content of nonvolatile ether extract, permissible crude fiber, ash, and ash insoluble in hydrochloric acid, methods of analysis as specified by Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food laws. *See* 154.0, 120. Nutmeg extract, oil of nutmeg. *See* 175.9, 813.9.

154.56 Saffron

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Saffron. Definition, permissible percentages of yellow stiles and foreign matter, volatile matter, total ash, and ash insoluble in hydrochloric acid.

References.—Methods of analysis, food laws. *See* 154.0, 120.

154.6 SALT

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Waters, Brine, and Salt. Salt. Tentative methods for determination of moisture, matters insoluble in water, sulphate, calcium, and magnesium.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Salt. Table salt, or dairy salt, definition, permissible percentages of calcium sulphate and of calcium and magnesium chlorides.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R70; 1927. Salt Packages. Simplified practice recommended and accepted by industry establishing a limited list of standard package sizes for pockets, cartons, burlap or cotton bags, and barrels for salt, sizes expressed in capacity in pounds of salt.

U. S. Gov., Federal Specifications Board. 364; 1925. Condiments. Rock salt. Rock salt for animals, half ground or lumps, or in compressed cakes, requirements on content of sodium chloride, freedom from deleterious matter, to use methods of analysis of Assn. of Official Agri. Chemists.

U. S. Gov., Federal Specifications Board. SS–S–31; 1930. Table Salt. For fine-grained type and for vacuum, free-running type, requirements on permissible calcium sulphate and of calcium and magnesium chloride, and insoluble matter in fine grained type, required purity of free running type, kinds and amount of drier.

References.—Sodium chloride (salt) as a chemical reagent. *See* 834.9. Food laws. *See* 120.

154.7 VINEGAR

154.70 General Items

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Vinegars. Preparation of sample, determination of specific gravity, solids, ash, alkalinity of soluble ash, phosphoric acid, volatile and nonvolatile acids, reducing substances, alcohol, glycerol, color, sulphates, formic acid, tartaric acid, preservatives, and tentative methods for determination of polarization, alcohol precipitate, mineral acids, metals, dextrin, coloring matters, presence of spices.

154.71 Vinegar

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Vinegar. Definition of vinegar, cider vinegar, or apple vinegar, required percentage of acetic acid. Definitions of wine vinegar, grade vinegar, malt vinegar, sugar vinegar, glucose vinegar, spirit vinegar, distilled vinegar, and grain vinegar, requirements on percentage of acetic acid.

U. S. Gov., Federal Specifications Board. Z–V–401; 1931. Vinegar. Cider vinegar, malt vinegar, and distilled vinegar. Requirements on method of preparation, percentage of acetic acid in product, includes 2 strength grades of distilled vinegar, methods of analysis as specified by Assn. of Official Agri. Chemists.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Vinegar. Definitions of vinegar and vinegar stock including required amount of acetic acid and permitted amount of alcohol.

References.—Methods of analysis, food laws. *See* 154.70, 120.

154.9 MISCELLANEOUS SPICES

U. S. Gov., Federal Specifications Board. EE–S–631; 1930. Spices. Curry, ground. Requirements on kinds of ingredients and general quality.

155. LEAVENING AGENTS

155.0 GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Baking Powders and Baking Chemicals. Preparation of sample, determination of total and of available carbon dioxide, of neutralizing value, tartaric acid, starch, ash, iron, aluminum, calcium, potassium and sodium, phosphoric acid, sulphuric acid, ammonia, and tentative methods for determination of lead, fluorides, arsenic.

155.1 BAKING POWDER

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Baking Powder. Definition, required acid reacting materials but not their proportions, required percentage yield of available carbon dioxide.

U. S. Gov., Federal Specifications Board. EE–P–611; 1930. Baking Powder. For tartaric acid type, phosphoric acid type, compounds of aluminum type, and combination of phosphoric acid and compounds of aluminum type, requirements on yields of available carbon dioxide, freedom from metallic impurities, and content of alumina and phosphorus pentoxide in the aluminum compound types, testing according to methods of Assn. of Official Agri. Chemists.

References.—Methods of analysis, food laws. *See* 155.0 and 120.

155.2 BAKING SODA

U. S. Gov., Federal Specifications Board. EE–S–571; 1930. Baking Soda. Shall be pure sodium bicarbonate.

References.—Sodium bicarbonate as a medicinal agent and as a chemical reagent. *See* 834.5. Methods of analysis, food laws. *See* 155.0, 834.5, 120.

155.3 CREAM OF TARTAR AND SUBSTITUTES

155.4 HOPS

U. S. Gov., Federal Specifications Board. HHH–H–491; 1930. Hops. Requirements on source, general quality, hand rubbing test, permissible amount of arsenic, testing in accordance with methods of Assn. of Official Agri. Chemists.

References.—Methods of analysis, food laws. *See* 120.

155.5 YEAST

U. S. Gov., Federal Specifications Board. EE–Y–131; 1931. Yeast. Covers 2 types, compressed yeast and dried yeast. For bread yeast prepared from grain mash, in conformity with Federal food and drugs act, requirements on general quality, color, degree of compression, permissible added starch, dead cells, and bacteria, and freedom from wild yeast and foreign organisms, for compressed yeast; freedom from moisture, screenings and foreign organisms for dried yeast.

References.—Methods of testing, food laws. *See* 120.

160–169 SUGAR, MOLASSES, SIRUP, HONEY, CONFECTIONERY

160. GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Sugar Beets. Tentative methods for determination of sucrose.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Sugars and Sugar Products. Sugars, Sirups, and Molasses. Preparation of sample, determination of moisture, solids, ash, alkalinity of ash, nitrogen, mineral adulterants in ash, determination of sucrose, sucrose and raffinose, glucose by polarimetric methods, chemical methods for determination of sucrose, invert, maltose, lactose, and dextrose.

U. S. Gov., Congress. 34 Stat. 768. June 30, 1906, as amended. (For text see S. R. A., F. D. No. 1; 1930 of Food, Drug, and Insecticide Administration of Dept. of Agriculture.) Federal food and drugs act. An act to prevent the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors, and for regulating traffic therein. Defines conditions which will be considered as adulteration or misbranding for drugs, confectionery, and foods, adopts for drugs the standards of U. S. Pharmacopœia and Nat. Formulary.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration, S. R. A., F. D. No. 1; 1930. Regulations for enforcement of Federal food and drugs act. Act applies to foods and drugs shipped in interstate or foreign commerce, standard methods of analysis to be those of U. S. Pharmacopœia and Nat. Formulary, and of Assn. of Official Agricultural Chemists, regulations regarding the labeling of drugs that do not meet the standards of U. S. Pharmacopœia or Nat. Formulary, regulations on powdering, on poisonous and deleterious ingredients, and on colors and preservatives, ingredients which require a statement on label, etc. Includes text of act as amended.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C19; 1924. Standard Density and Volumetric Tables. Includes tables of density of solutions of cane sugar.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Dextrose. Sample No. 41 prepared and sold by the bureau for use in industry and by others as a standard reducing sugar.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Sucrose. Sample No. 17 prepared and sold by the bureau, for use in industry and by others as a standard in calorimetric and saccharimetric measurements.

U. S. Gov., Dept. of Commerce. Bureau of Standards; T115; 1918. New Baumé Scale for Sugar Solutions. Adopted by Manufacturing Chemists Assn. of U. S., the Bureau of Standards, and by all manufacturers of hydrometers. Scale is based on specific gravity values of Plato, 20° C., and the modulus 145. Tables show relation between degrees Brix or percent sucrose, specific gravity, and degrees Baumé.

161. SUGAR

161.1 SUGAR, GRANULATED

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sugar. Definition, required content of sucrose for granulated, loaf, cut, milled, and powdered sugars. General definitions of maple sugar, maple concrete, massecuite, melada, mush sugar, and concrete.

U. S. Gov., Federal Specifications Board. JJJ–S–791; 1931. Beet or Cane Sugar. Includes white granulated sugar, fine and medium grain grades, conforming to Federal food and drugs act, required content of sucrose, chemical tests in accordance with methods of Assn. of Official Agricultural Chemists.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Sucrose. For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Methods of analysis, density tables, food laws. *See* 160. Other sugars. *See* 161.2 to 161.7.

161.2 SUGAR, POWDERED

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sugar, Powdered. Definition, required percentage of sucrose.

U. S. Gov., Federal Specifications Board. JJJ–S–791; 1931. Beet or Cane Sugar. Includes white powdered sugar of 3 grades, coarse, XXXX confectioners, and XXXX icing, conforming to Federal food and drugs act, required content of sucrose, permissible starch in icing sugar, chemical tests in accordance with methods of Assn. of Official Agricultural Chemists.

References.—Methods of analysis, food laws, density tables. *See* 160.

161.3 LOAF SUGAR

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sugar, Loaf. Definition, required percentage of sucrose.

U. S. Gov., Federal Specifications Board. JJJ–S–791; 1931. Beet or Cane Sugar. Includes white tablet, cube, or domino sugar, conforming to Federal food and drugs act, required content of sucrose, chemical tests in accordance with methods of Assn. of Official Agricultural Chemists.

References.—Methods of analysis, density tables, food laws. *See* 160.

161.4 GRAPE AND CORN SUGAR

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Dextrose. Definition of dextrose (commercially known as refined corn sugar when derived from corn starch), requirements on content of dextrose and permissible moisture content for anhydrous dextrose and for hydrated dextrose, used in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Dextrose. For medicinal purposes, description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Methods of analysis, density, tables, food laws. *See* 160.

161.5 SOFT SUGAR

U. S. Gov., Federal Specifications Board. JJJ-S-791; 1931. Beet or Cane Sugar. Includes brown sugar commercially known as refiners' soft sugar, medium No. 5 to No. 10, conforming to Federal food and drugs act, general requirements on flavor and uniformity of color.

References.—Methods of analysis, food laws, density tables. *See* 160.

161.6 STARCH SUGAR

References.—Grape and corn sugar. *See* 161.4. Methods of analysis, density tables, food laws. *See* 160.

161.7 LACTOSE, MILK SUGAR

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Lactose. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Methods of analysis, density tables, food laws. *See* 160.

162. HONEY

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Honey. Preparation of sample, determination of moisture, ash, alkalinity of soluble ash, reducing sugars, sucrose, free acid, and tentative methods for polarization, determination of levulose, dextrose, dextrine, commercial glucose, commercial invert sugar, and diastase.

Mountain States Honey Producers Assn. Honey Grades. Undated. Definitions of 6 grades of honey, giving range of each grade by Pfund grader, with two points of tolerance between each grade, differing somewhat from Government standards.

U. S. Gov., Dept. of Agriculture. Bureaus of Entomology and Agricultural Economics. Circular 24; 1927. U. S. Grades, Color Standards, and Packing Requirements for Honey. Permissive standards for extracted honey, definitions of 4 grades as regards ripening, freedom from damage due to overheating, fermentation, objectionable flavors, etc., minimum unit weight, color classification into 7 grades as determined by standard color grader described.

U. S. Gov., Dept. of Agriculture. Bureaus of Entomology and Agricultural Economics. Circular 24; 1927. U. S. Grades, Color Standards, and Packing Requirements for Honey. Permissive standards for section comb honey and cut comb honey, definitions of 7 grades of section honey, 3 grades of shallow frame comb honey, and 7 grades of cut comb honey, as regards freedom from pollen cells, defective flavor and damaged honey, uniformity in color, appearance of sections, dryness of surface, attachment to section sides, permissible through holes and empty cells, minimum weight, classification into 4 color grades as determined by standard color grader described.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Honey. Definition of honey, comb honey, extracted honey, and strained honey, permissible percentages of water, ash, and sucrose.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A. 1926. Honey. For medical purposes, physical properties, identity tests, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

163. MOLASSES AND REFINERS SIRUP

163.1 MOLASSES, PORTO RICO

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Molasses. Definition, permissible percentages of water and of ash.

References.—Methods of analysis, food laws. *See* 160.

163.2 MOLASSES, NEW ORLEANS

References.—*See* 163.1.

163.3 REFINERS SIRUP

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Refiners Sirup, Treacle. Definition, permissible percentages of water and of ash.

References.—Methods of analysis, food laws. *See* 160. 160.

164. SIRUP

164.1 MAPLE SIRUP

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Sugars and Sugar Products. Maple Products. Preparation of sample of sirup and of sugar, determination of moisture, polarization, reducing sugar, sucrose, commercial glucose, ash, alkalinity of ash, conductivity value, and tentative methods for determination of lead number, malic acid value, metals.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Maple Sirup. Definition, permissible percentage of water, required weight per gallon.

U. S. Gov., Federal Specifications Board. JJJ-S-351a; 1931. Sirup. Maple sirup. Definition, requirements on freedom from sediment, Baumé test, to conform to Federal food and drugs act.

U. S. Gov., Federal Specifications Board. JJJ-S-351a; 1931. Sirup. For sugar and maple sirup, requirements on percentage of maple sirup, Baumé test, to conform to Federal food and drugs act.

References.—Food laws. *See* 160. Sugar density scales. *See* 160.

164.2 CORN SIRUP AND GLUCOSE

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Glucose. Definition, permissible percentage of ash, chief constituents of ash.

U. S. Gov., Federal Specifications Board. JJJ-S-351a; 1931. Sirup. For corn and refiners' blended sirup, requirements on percentage of refiners' sirup, Baumé test permissible ash, to conform to Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Glucose. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Methods of analysis, food laws. *See* 160. Sugar density scales. *See* 160.

164.3 BLENDED SIRUP

U. S. Gov., Federal Specifications Board. JJJ–S–351a; 1931. Sirup. Blended cane sugar and refiners' sirup. Permissible content of ash, required Baumé test, to conform to Federal food and drugs act.

U. S. Gov., Federal Specifications Board. JJJ–S–351a; 1931. Sirup. For corn and refiners' blended sirup, requirements on percentage of refiners' sirup, Baumé test, permissible water and ash, to conform to Federal food and drugs act.

References.—Methods of analysis, food laws. *See* 160. Sugar density scales. *See* 160. Sugar and maple sirup. *See* 164.1.

164.4 CANE SIRUP

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sugar Cane Sirup. Definition, permissible percentages of water and of ash.

U. S. Gov., Federal Specifications Board. JJJ–S–351a; 1931. Sirup. For sugar cane sirup, requirements on percentage of water and of ash allowed, Baumé test, to conform to Federal food and drugs act, specifications for shipping crate.

References.—Methods of analysis, food laws. *See* 160. Sugar density scales. *See* 160.

164.5 SORGHUMS

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sorghum Sirup. Definition, permissible percentages of water and of ash.

References.—Methods of analysis, food laws. *See* 160. Sugar density scales. *See* 160.

164.6 SUGAR SIRUP

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sugar Sirup. Definition, permissible percentage of water.

References.—Sugar. *See* 161.1. Methods of analysis, food laws. *See* 160. Sugar density scales. *See* 160.

165. CONFECTIONERY

165.0 GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Confectionery. Preparation of sample, determination of moisture, ash, alkalinity of ash, nitrogen, sucrose, glucose, alcohol in sirups, tentative methods for determination of mineral adulterants in ash, starch, ether extract, coloring matter, and metals.

165.1 CANDY

U. S. Gov., Federal Specifications Board. EE–C–71; 1931. Candy. For chocolates, bon bons, hard candy, and stick candy, made from saccharine substances with or without coloring, flavoring, or filling materials, requirements on freedom from mineral substances, poisonous color or flavors, deleterious ingredients, spiritous liquors, and narcotic drugs, to conform to Federal food and drugs act, to be standard commercial brands, requirements on number of pieces to pound and assortment of varieties for chocolates, flavor of lemon drops, assortment of flavors for stick candy.

References.—Methods of analysis, food laws. *See* 165.0, 160. Sugar. *See* 161.1. Chocolate and chocolate coating. *See* 151.3.

165.2 CHEWING GUM

165.3 ICE CREAM

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Ice Cream (Plain). Preparation of sample, determination of fat, tentative method for detection of coloring matters.

References.—Ice cream brick cartons, brick molds. *See* 954.1, 785.2.

170–179 BEVERAGES

170. GENERAL ITEMS

U. S. Gov., Congress. 34 Stat. 768. June 30, 1906, as amended. (For text see S. R. A., F. D. No. 1. 1930 of Food, Drug, and Insecticide Administration of Dept. of Agriculture.) Federal food and drugs act. An act to prevent the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors, and for regulating traffic therein. Defines conditions which will be considered as adulteration or misbranding for drugs, confectionery, and foods, adopts for drugs the standards of U. S. Pharmacopoeia and Nat. Formulary.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 1; 1930. Regulations for enforcement of Federal food and drugs act. Act applies to foods and drugs shipped in interstate or foreign commerce, standard methods of analysis to be those of U. S. Pharmacopoeia and Nat. Formulary, and of Assn. of Official Agricultural Chemists, regulations regarding the labeling of drugs that do not meet the standards of U. S. Pharmacopoeia or Nat. Formulary, regulations on powdering, on poisonous and deleterious ingredients, and on colors and preservatives, ingredients which require a statement on label, etc. Includes text of act as amended.

U. S. Gov., Treasury Dept. Internal Revenue. U. S. Internal-Revenue Gaugers' Manual; 1913. Proof Spirit. Definition of proof spirit as regards percentage by volume of absolute alcohol and of water, definitions of 100 proof, 200 proof, etc.

171. DISTILLED LIQUORS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Distilled Liquors. Determination of specific gravity, alcohol, extract, ash, acidity, esters, aldehydes, furfural, fusel oil, sugars, methyl alcohol, and tentative methods for determination of coloring matters, caramel.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Brandy. For medical purposes, physical properties, identity tests, test requirements for purity, requirements for percentage of alcohol and for storage before use. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Whiskey. For medical purposes, physical properties, identity tests, test requirements for purity, requirements on percentage of alcohol and storage before use. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food laws, strength definitions. *See* 170. Alcohol. *See* 822.4.

173. WINES

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Wines. Preparation of sample, determination of specific gravity, alcohol, glycerol, extract, non-sugar solids, reducing sugars, sucrose, commercial glucose, ash, alkalinity of ash, phosphoric and sulfuric acids, chlorides, volatile acids, tartaric acid, tannin and coloring matter, protein, pentosans, preservatives.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Wine. Definition, limiting percentages of alcohol, permissible percentages of sodium chloride, potassium sulphate, and of volatile acids. For dry wine, permissible percentages of sugar, grape ash and sugar-free grape solids. For sweet wine, definition, required amounts of sugar and grape ash. Fortified sweet wine, definition, requirements for the sweet wine to be fortified and of the wine spirits added for fortification as fixed by acts of Congress including percentage and purity of sugar added. Sparkling wine, definition, required grape ash. Modified or ameliorated wine, definition, requirements on final alcoholic strength.

References.—Food laws, strength definitions. *See* 170. Alcohol. *See* 822.4.

175. FLAVORING EXTRACTS

175.1 ALMOND EXTRACT

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Almond Extract. Tentative Methods. Determination of alcohol, benzaldehyde, benzoic acid, hydrocyanic acid, nitrobenzol.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Almond Extract. Definition, requirements on percentage of oil of bitter almonds and freedom from hydrocyanic acid, species of bitter almond, apricot, or peach from which oil of bitter almond is obtained.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Almond Extract. Required percentage of oil of bitter almonds in extract when alcohol is permitted in the manufacture.

175.2 CASSIA EXTRACT

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Cassia Extract. Tentative methods for determination of alcohol, oil, refractive index and color reaction of oil with ferric chloride.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Cassia extract. Required percentage of oil of cassia in extract in order to obtain permission to use alcohol in its manufacture.

References.—Food laws. *See* 170.

175.3 PEPPERMINT EXTRACT

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Peppermint Extract. Tentative method for determination of alcohol and oil.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Peppermint Extract. Definition, required percentage of oil of peppermint, definition of oil of peppermint with required percentage of menthol.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Peppermint extract. Required percentage of oil of peppermint in the extract in order to obtain permission to use alcohol in its manufacture.

References.—Oil of Peppermint for Medical Purposes. *See* 813.9.

175.4 VANILLA EXTRACT

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Vanilla Extract and Its Substitutes. Determination of specific gravity, alcohol, vanillin and coumarin, lead number, solids, ash, sucrose, and tentative methods for determination of glycerol, vanilla resins, color value, coloring matters.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Vanilla Extract. Definition, required percentage of soluble matter from the vanilla bean.

U. S. Gov., Federal Specifications Board. EE–E–911; 1930. Flavoring Extracts and Nonalcoholic Flavors. Vanilla. For extra concentrated extract, 4X strength extract, regular strength extract, and imitation extract with artificial flavoring and coloring, requirements on preparation and strength of extracts and amount of alcohol, required constituents of imitation extract, test methods of Assn. of Official Agri. Chemists.

U. S. Gov., Treasury Dept., Bureau of Prohibition. Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Vanilla extract, and imitation vanilla extract. Required amount of soluble matter of vanilla bean in vanilla extract and of vanillin and coumarin in imitation extract, in order to obtain permission to use alcohol in their manufuacture.

References.—Vanilla for medicinal purposes. *See* 819.9.

175.5 WINTERGREEN EXTRACT

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Wintergreen Extract. Tentative methods for determination of alcohol, oil, and methyl salicylate.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Wintergreen Extract. Definition, required percentage of oil of wintergreen, definition of oil of wintergreen.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Wintergreen extract, and imitation wintergreen extract. Required percentage of oil of wintergreen in wintergreen extract and of methyl salicylate in the imitation extract, in order to obtain permission to use alcohol in their manufacture.

References.—Oil of Wintergreen for medical purposes. *See* 813.9.

175.6 LEMON EXTRACT

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Lemon and Orange Extracts. Determination of specific gravity, alcohol, lemon and orange oils, aldehydes, citral, solids, ash, sucrose, methyl alcohol, and tentative methods for determination of glycerol, and coloring matters.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Lemon Extract. Definition, required percentage of oil of lemon, definition of oil of lemon with required optical rotation and percentage of citral.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Terpeneless Extract of Lemon. Definition, required percentage of citral obtained from oil of lemon.

U. S. Gov., Federal Specifications Board. EE–E–911; 1930. Flavoring Extracts and Nonalcoholic Flavors. Lemon. For concentrated extract, extract, terpeneless extract and nonalcoholic lemon flavor, requirements on ingredients and preparation, percentages of oil of lemon, citral, and alcohol in extracts, and percentages of oil of lemon and cottonseed oil in the flavor, test methods of Assn. of Official Agri. Chemists.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Lemon extract, terpeneless extract of lemon, and imitation lemon extract. Required percentage of oil of lemon for lemon extract and of citral for the other 2 extracts, in order to obtain permission to use alcohol in their manufacture.

References.—Oil of Lemon for Medical Purposes. *See* 813.9. Lemon oil, nonmedicinal. *See* 142.97.

175.7 ORANGE EXTRACT

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Lemon and Orange Extracts. Determination of specific gravity, alcohol, lemon, and orange oils, aldehydes, citral, solids, ash, sucrose, methyl alcohol, and tentative methods of determination of glycerol, and coloring matters.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Orange Extract. Definition, required percentage of oil of orange, definition of oil of orange with required optical rotation.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Terpeneless Extract of Orange. Definition, definition of terpeneless oil of orange.

U. S. Gov., Federal Specifications Board. EE–E–911; 1930. Flavoring Extracts and Nonalcoholic Flavors. Orange. For extract of orange, terpeneless extract of orange, and nonalcoholic orange flavor, requirements on preparation, percentages of alcohol and oil of orange in the extracts, percentages of oil of orange and of cottonseed oil in nonalcoholic orange flavor, test methods of Assn. of Official Agri. Chemists.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Orange extract, and terpeneless extract of orange. Required percentage of oil of orange in order to obtain permission to use alcohol in its manufacture.

References.—Oil of Orange for Medical Purposes. *See* 813.9. Orange oil, nonmedicinal. *See* 142.97.

175.9 MISCELLANEOUS SPECIFICATIONS FOR FLAVORING EXTRACTS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Anise and Nutmeg Extracts. Tentative method for determination of oil.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Cassia, Cinnamon, and Clove Extracts. Tentative methods for determination of alcohol, oil, refractive index, color reaction with ferric chloride for the oil.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Ginger Extract. Tentative methods for determination of alcohol, solids, identification of ginger and capsicum.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Spearmint Extract. Tentative method for determination of alcohol and of oil.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Anise Extract. Definition, required percentage of oil of anise, definition of oil of anise.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Celery Seed Extract. Definition, required percentage of oil of celery seed.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Ceylon Cinnamon Extract. Definition, required percentage of oil of Ceylon cinnamon, definition of oil of Ceylon cinnamon with required percentage of cinnamic aldehyde and allowed amount of eugenol.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Cinnamon Extract, or Cassia Extract, or Cassia Cinnamon Extract. Definition, required percentage of oil of cinnamon, definition of oil of cinnamon with required percentage of cinnamic aldehyde.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Clove Extract. Definition, required percentage of oil of cloves, definition of oil of cloves.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Ginger Extract. Definition, required content of ginger.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Nutmeg Extract. Definition, required percentage of oil of nutmeg, definition of oil of nutmeg.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Rose Extract. Definition, required percentage of attar of roses, definition of attar of roses.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Savory Extract, Definition, required percentage of oil of savory, definition of oil of savory.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Spearmint Extract. Definition, required percentage of oil of spearmint, definition of oil of spearmint.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Star Anise Extract. Definition, required percentage of oil of star anise, definition of oil of star anise.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sweet Basil Extract. Definition, required percentage of oil of sweet basil, definition of oil of sweet basil.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sweet Marjoram Extract. Definition, required percentage of oil of marjoram, definition of oil of marjoram.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Thyme Extract. Definition, required percentage of oil of thyme, definition of oil of thyme.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Tonka Extract. Definition, required percentage of coumarin extracted from tonka bean.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Allspice extract, anise extract, caraway extract, celery seed extract, cinnamon extract, clove extract, kummel extract, nutmeg extract, rose extract, savory extract, spearmint extract, star anise extract, sweet basil extract, sweet marjoram extract, thyme extract, and tonka extract. Required percentage of oil of allspice, oil of anise, etc., in the respective extracts in order to obtain permission to use alcohol in their manufacture.

References.—Spices. *See* 154. Oils of various spices for medicinal purposes. *See also* 813.9.

176. MINERAL WATERS

176.0 GENERAL ITEMS

American Bottlers of Carbonated Beverages. Educ. Bull. No. 4; 1930. Gas Volume Test. Recommended practice on standard method for testing bottled carbonated beverages for gas volume with chart of values for use in making the determination.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Waters, Brine and Salt. Mineral Water. Determination of specific gravity, solids, nitrogen, chlorine, hydrogen sulphide, carbonic and bicarbonic acids, silica, iron and other metals, sulphuric acid, phosphoric acid, iodine, bromine, arsenic, boric acid.

176.1 SELTZERS

176.2 VICHY WATER

176.3 TABLE WATERS

U. S. Gov., Federal Specifications Board. EE-W-111; 1931. Table Water, Effervescent. To be of type known as carbonated mineral water, to be pure, wholesome, palatable, conforming to standards for sanitary quality of Food and Drug Administration of U. S. Dept. of Agriculture, to conform to Federal food and drugs act, to contain carbonic acid gas in solution.

177. BITTERS, GINGER ALE, SARSAPARILLA

177.1 BITTERS

177.2 GINGER ALE

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2, 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Ginger Ale. General definition, materials entering into its composition, definition of ginger ale flavor.

U. S. Gov., Federal Specifications Board. EE-G-391; 1931. Ginger Ale. For 2 types, dry, pale color, without capsicum, and aromatic or golden with capsicum, in conformity with Federal food and drugs act, requirements on flavor and make-up, required sugar content, chemical tests in accordance with methods of Assn. of Official Agricultural Chemists.

References.—Methods of test, food laws. *See* 176.0, 170.

177.3 SARSAPARILLA

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Used in enforcement of food and drugs act. Sarsaparilla. Definition, definition of sarsaparilla flavor with materials entering into its composition but not their proportions.

References.—Methods of test, food laws. *See* 176.0, 170.

178. FRUIT JUICE BEVERAGES

178.0 GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Beverages (Non-Alcoholic) and Concentrates. Methods for determination of specific gravity, alcohol, acidity, esters, total solids, sucrose, reducing sugars, commercial glucose, ash, alkalinity of ash, preservatives, anthranilic acid esters, tentative methods for determination of citric acid, tartaric acid, coloring matters, and metals.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Fruit Juice. Definition, used in enforcement of Federal food and drugs act.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulation 2; 1927. Relating to Permits for the

Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Liquid food products. Permissible percentage of alcohol.

178.1 LEMON JUICE

178.2 LIME JUICE

178.3 ORANGE JUICE

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products Orange Juice. Definition, used in enforcement of Federal food and drugs act.

178.4 GRAPE JUICE

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 2, Rev. 2; 1931. Definitions and Standards for Food Products. Grape juice. Definition, used in enforcement of Federal food and drugs act.

U. S. Gov., Federal Specifications Board. Z-G-661; 1931. Grape Juice. For unfermented juice of sound ripe grapes, made by single pressing, requirements on general quality, Concord variety of grape unless otherwise specified.

179. MISCELLANEOUS BEVERAGE SPECIFICATIONS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Beers. Preparation of sample, determination of specific gravity, alcohol, extract, degree of fermentation, lactic, acetic and phosphoric acids, reducing sugars, glycerol, ash, protein preservatives, and tentative methods for determination of color, dextrin, polarization, coloring matters, and metals

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Cider. Definitions of cider, sweet cider, and preserved sweet cider with 2 permitted methods of preservation for the preserved sweet cider.

200–299 VEGETABLE PRODUCTS, EXCEPT FOOD, FIBERS, AND WOOD

200–209 RUBBER AND SIMILAR GUMS AND MANUFACTURES THEREOF

200. GENERAL ITEMS

American Railway Assn. Mechanical Division. Recommended Practice. 1923. Rubber Goods, Mechanical, General Instructions on Standard Methods of Tests for. Preparation of specimen, measurement, marking and test procedure for tension, elongation, permanent set, friction, hydrostatic, steaming tests and dimensions of standard test specimens.

American Society for Testing Materials. D 15–24; 1924. Methods of Testing Rubber Products. Preparation of test specimen and reagents, short chemical test procedure for determination of free sulphur, total sulphur and ash, complete chemical test procedure and apparatus for determination of rubber hydrocarbons, saponifiable acetone extract, unsaponifiable resins, chloroform and alcoholic potash extracts. Apparatus test specimens and test procedure for tensile, adhesive, and hydrostatic pressure tests of rubber materials and hose.

American Society for Testing Materials. Tentative Methods. D 297–31T; 1931. Methods of Chemical Analysis of Rubber Products. Includes a short procedure for determination of acetone extract, free sulphur, alcoholic-potash extract, total sulphur, and ash. Also a complete procedure for 30 per cent Hevea rubber compounds, including above determinations total sulphur, antimony, free carbon, etc.

American Society for Testing Materials. Tentative Test Method. D–314–31T; 1931. Method of Test for Hardness of Rubber. Applicable to tire treads and automotive mechanical rubber parts but not to extremely hard or extremely soft goods. Dimensions and construction of standard indentor, dimensions of test specimen, method of test.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C38; 1915. Testing of Rubber Goods. Describes Bureau of Standards procedure for testing mechanical rubber goods, including thickness measurement, test for set, tensile strength, test for adhesion of plies in rubber line hose and rubber belting, and methods of chemical analysis.

U. S. Gov., Federal Specifications Board. 59a. (Superseded by ZZ–R–601; 1930.) Rubber Goods. Methods of sampling, physical tests, and chemical analysis for rubber goods of various kinds, physical tests include tests for tensile strength and elongation, set, adhesion of rubber and reinforcement, hardness, steam test, boiling test, aging, hydrostatic test, specific gravity, etc.

References.—Waterproofing compounds for fabrics. *See* 849.6. Test methods for cotton fabrics. *See* 300.4.

201. RUBBER UNMANUFACTURED

201.1 CRUDE RUBBER

201.2 SCRAP AND RECLAIMED RUBBER

National Assn. of Waste Material Dealers (Inc.). Circular H; 1928. Standard Classification for Scrap Rubber. Definition of class with number and code word for each.

202. HOSE (RUBBER, COTTON, AND LINEN)

202.0 GENERAL ITEMS

American Marine Standards Committee. O No. 1; 1926. Kinds and Sizes of Hose for Ship Equipment. Size and purpose with general description of each type.

American Society for Testing Materials. D 181–25; 1925. Tolerances for Hose Ducks and Belt Ducks. Tolerances on width, weight, thread count and gage, crimp, and tensile strengths.

202.1 AIR HOSE

202.11 Air Brake and Signal Hose

American Electric Railway Engr. Assn. Recommended Specification. E102–30; 1930. Air Brake Hose. Porosity, bursting, friction, stretching, and tension tests, hose dimensions, specification for fabric wrapping, drawings of tensile test grips.

American Railway Assn. Mechanical Div. Air Brake Hose Coupling; 1926. Controlling dimensions of standard design.

American Railway Assn. Mechanical Div. Air Brake Hose Coupling Gages for Gaging Guard Arm and Tips on Used Couplings. Recommended Practice; 1926. Dimensions and design.

American Railway Assn. Mechanical Div. Air Brake Hose Coupling Gasket; 1926. Dimensions and tolerances of standard gasket.

American Railway Assn. Mechanical Div. Air Brake Hose Coupling Packing Ring Gage; 1921. Dimensions and design.

American Railway Assn. Mechanical Div. Air Brake Hose Nipple; 1927. Dimensions of standard nipple provided with 1¼-inch pipe thread at one end.

American Railway Assn. Mechanical Div. Gages for Gaging New Air Brake Hose Couplings; 1928. Dimensions and design for 12 gages.

American Railway Assn. Mechanical Div. Gaskets for Air Brake Hose; 1929. Gaskets of rubber compound, deflection and tension test requirements, dimensioned drawing.

American Railway Assn. Mechanical Div. Hose, Air-Brake and Train Air-Signal; 1928. For rubber hose with cotton reinforcement, requirements on number of cotton plies, on construction of hose, on adhesion of plies test, permanent set test, tension test of rubber tube and cover, hydrostatic test, standard sizes and dimensions.

U. S. Gov., Federal Specifications Board. 43; 1922. Air Brake and Signal Hose and Gaskets. For cotton reinforced rubber hose, requirements on construction, dimensions, material and weave of cotton reinforcement, tensile strength, elongation, porosity, and hydrostatic test, methods of test. For gaskets, requirements on dimensions, design, deflection test and tension test.

References.—Methods of testing. *See also* 200. Hose duck. *See* 202.0.

202.12 Pneumatic Tool Hose

American Marine Standards Committee. O No. 16; 1928. Rubber Air Hose. For wrapped and braided air hose of ½ inch and ¾ inch, requirements for cotton reinforcement and rubber cover, dimensions, test requirements for pressure, tension, and friction. Substantially in accord with Am. Railway Assn. spec's for air hose.

American Railway Assn. Mechanical Div. Hose, Air, Gas and Oxygen, Wrapped and Braided; 1928. Air hose for not more than 125 pounds pressure, gas and oxygen hose for gas welding outfits, construction requirements and number of cotton plies, size and construction of wire armor, weight of woven cotton jacket, test requirements for adhesion of plies, permanent set, tension test of tube and cover, hydrostatic test, standard sizes and dimensions.

American Society for Testing Materials. D 46–24; 1924. Wrapped Air Hose for Use with Pneumatic Tools. For pressures up to 125 pounds, construction of hose, number of plies of cotton reinforcement, size of armor wire for armored hose, standard sizes and dimensions, requirements for tensile strength and elongation for rubber tube and cover, for adhesion between plies, and hydrostatic pressure using A. S. T. M. test methods, D 15.

American Society for Testing Materials. D 60–24; 1924. Braided Air Hose for Use with Pneumatic Tools. For pressures up to 125 pounds, construction of rubber hose with braided cotton ply reinforcement, dimensions of protective wire armor or cotton jacket where specified, tensile strength and elongation for rubber tube and cover, adhesion of plies and hydrostatic pressure test requirements, standard dimensions.

U. S. Gov., Federal Specifications Board. ZZ–H–491; 1931. Pneumatic Hose. For wrapped construction, cotton reinforced, for 5 sizes up to 1¼ inches, requirements on construction, thickness of rubber, number of plies, hydrostatic test and burst test, tensile tests of rubber, methods of test in accordance with F. S. B. spec. ZZ–R–601 for rubber goods.

References.—Methods of testing. *See also* 200. Standard sizes, hose duck. *See* 202.0.

202.13 Divers' Hose

U. S. Gov., Federal Specifications Board. 44b; 1925. Divers Hose. For 1 grade of "sinking" type, requirements on construction of rubber hose with 3 ply cotton reinforcement, general quality of reinforcement, dimensions of hose, chemical composition of rubber, tension, elongation, adhesion of ply, and hydrostatic pressure test requirements, in accordance with testing methods of F. S. B. spec. 59 for rubber goods.

References.—Methods of testing. *See also* 200. Standard sizes, hose duck. *See* 202.0.

202.2 CHEMICAL AND OIL HOSE

202.21 Chemical Hose

Underwriters' Laboratories. Rubber Lined Fire Hose for Chemical Fire Extinguishers and Chemical Fire Engines; 1920. General construction of cotton reinforced hose with wrapped or braided reinforcement or with outer cotton jacket, thickness of inner and outer rubber coverings, number of cotton plies, test requirements for hydrostatic pressure, adhesion of plies, tension and chemical tests of rubber.

U. S. Gov., Federal Specifications Board. 47; 1922. Chemical Hose. For chemical fire extinguishers and fire engines, sizes ⅜ to 1¼ inches, requirements on construction of wrapped reinforced rubber hose, braided reinforced rubber hose, and cotton jacketed rubber hose, minimum thicknesses of rubber lining and cover, number of reinforcement plies, tension test, adhesion of plies test, and hydrostatic test requirements, chemical composition of rubber compound.

References.—Methods of testing. *See also* 200. Hose duck. *See* 202.0.

202.22 Oil Hose

American Marine Standards Committee. O No. 20–1928. Oil Suction and Discharge Hose, Rubber Covered. For 4, 6, and 8 inch sizes, specifications for wire and cotton reinforcement, rubber layer and cover, test requirements for hydrostatic pressure, tension and friction.

U. S. Gov., Federal Specifications Board. ZZ–H–481; 1931 Oil Suction and Discharge Hose. For cotton duck and wire reinforced hose, requirements on construction, weight and general quality of duck, amount of wire, number of plies, dimensions of 4, 6, and 8 inch sizes, tensile strength, elongation, set, adhesion of parts, and hydrostatic tests for hose, methods of test specified in F. S. B. spec. 59 for rubber goods.

References.—Methods of testing. *See also* 200. Standard sizes, hose duck. *See* 202.0.

202.3 GAS AND GASOLINE HOSE

202.31 Gas Hose

American Gas Assn. Approval Requirements for Flexible Gas Tubing; 1926. Performance requirements and methods of test for leakage, capacity, strength, flexibility, resistance to heat and freezing, elasticity and gripping power of rubber slip ends, drawing of standard hose and nozzle.

American Railway Assn. Mechanical Div. Hose, Air, Gas and Oxygen, Wrapped and Braided; 1928. For gas and oxygen hose for gas welding outfits, construction requirements and number of cotton plies, size and construction of wire armor, weight of woven cotton jacket, test requirements for adhesion of plies, permanent set, tension test of rubber tube and cover, hydrostatic test, standard sizes and dimensions.

U. S. Gov., Federal Specifications Board. ZZ–H–461; 1931. Gas Hose. One grade of hose for acetylene-hydrogen, and for oxygen. Construction of rubber hose with cotton reinforcement, dimensions, friction strength, and hydrostatic pressure strength requirements for hose, tensile strength requirements for rubber tube and cover, methods of sampling, methods of test according to F. S. B. spec. ZZ–R–601.

References.—Methods of testing. *See also* 200. Hose duck. *See* 202.0.

202.32 Gasoline Hose

Underwriters' Laboratories. Rubber Hose for Conducting Gasoline; 1924. Applies to short lengths of flexible hose, made of inner rubber tube, canvas layers or braid, and outer rubber cover, inside diameter, construction, thickness of rubber, number of cotton plies, pressure and tension test requirements for hose, adhesion test for plies, chemical test of rubber of inner tube.

Underwriters' Laboratories. Construction of ¾, 1, and 1¼ inch Cotton Covered Rubber Metal Hose for Conducting Gasoline; 1925. Maximum length of hose, construction of packed flexible metal tube of galvanized steel, brass, bronze, or copper, thickness of rubber, construction of rubber tube and cotton jacket, test requirements for repeated bending, hydrostatic pressure, failure on bending, and crushing, test of rubber tube for tension, and solubility in gasoline.

U. S. Gov., Federal Specifications Board. ZZ–H–466; 1930. Rubber-Metal Gasoline Hose. Requirements on construction, bending test of metal tubing, bending, crushing, and hydrostatic tests for hose, tensile test of rubber, gasoline extract of rubber, methods of sampling, methods of test as specified in F. S. B. spec. ZZ–R–601 for rubber goods.

References.—Methods of testing. *See also* 200. Hose duck. *See* 202.0.

202.4 WATER HOSE, STEAM HOSE

202.41 Fire Hose

American Marine Standards Committee. O No. 3–1926. Specification for 2½-inch Double-Jacketed Cotton Rubber-Lined Fire Hose. Construction, length, weight, hydrostatic pressure, and kink test requirements, strength and chemical test requirements for the rubber parts, adhesion tests.

American Marine Standards Committee. O No. 4–1930. 2½-inch. Unlined Linen Fire Hose. For flax-line hose and for flax-tow hose, requirements on general quality and chemical test of yarn, construction and length of hose, tests for bursting strength, kink, and leakage in conformity with requirements of Underwriters Laboratories.

American Marine Standards Committee. O No. 11–1926. Specification for 2½-inch Single-Jacketed Cotton Rubber-Lined Fire Hose. Caution on its use, construction, requirements, length and weight, pressure and kink test requirements, strength, chemical and adhesion tests of rubber parts.

American Railway Assn. Mechanical Division. Recommended Practice; 1927. Hose, Fire. Cotton rubber lined and linen unlined hose for private fire departments, construction, tensile, stretch, friction, and hydrostatic test requirements, dimensions of rubber lined hose, chemical composition and weight of couplings, hydrostatic and kink test requirements for unlined linen hose.

American Society for Testing Materials. Tentative Specifications. D 296–31T; 1931. Joint sponsor with Fire Protection Group under procedure of American Standards Assn. and under designation L 3–1931. Cotton Rubber-Lined Fire Hose for Public and Private Fire Department Use. For 1½ to 3½ inch sizes of single, double and triple jacketed hose, construction, thickness of rubber lining, chemical composition, tension, and life test requirements for rubber lining, hydrostatic pressure, twist, warp, and kink test requirements for hose.

Associated Factory Mutual Fire Insurance Companies. Fire Hose, Couplings, Playpipes and Hose Houses; 1930. Includes construction, leakage, and bursting strength requirements for linen hose for inside factory use for 1¼ and 2½ inch sizes.

Associated Factory Mutual Fire Insurance Companies. Fire Hose, Couplings, Playpipes and Hose Houses; 1930. Includes for fire hose, the specifications for cotton fabric, tensile, adhesion test requirements, and chemical analysis of rubber lining, bursting strength of hose for 2½ inch single jacketed and double jacketed rubber lined hose for mill yard use, includes special sizes from 1¼ to 3½ inches.

Underwriters' Laboratories, (Inc.) Cotton Rubber Lined Fire Hose; 1931. For public and private department use, essentially same as the specifications adopted by American Standards Assn., for single, double, and triple jacketed hose of sizes 1½ to 3½ inches, requirements on thickness of rubber lining, manufacture of hose, hydrostatic, bursting, and kink tests for hose, adhesion, tensile test, and chemical tests for rubber lining and for rubber cover, methods of test.

Underwriters' Laboratories, (Inc.) Unlined Fire Hose (Flax Line); 1930. Covers hose without a rubber lining for use inside of buildings, requirements on quality and chemical tests of flax yarn, standard hose sizes and tolerances, construction of hose, bursting strength tests, kink tests, and leakage test, methods of testing.

U. S. Gov., Federal Specifications Board. ZZ–H–451; 1931. Cotton Rubber-Lined Fire Hose. Requirements for construction of hose, weight, and flexibility of finished hose, hydrostatic pressure test for strength, elongation, twist, warp, and rise, requirements of rubber lining for rubber content, sulphur, acetone extract, tensile properties, set, life tests, and adhesion between backing and lining, methods of sampling, methods of test in accordance with F. S. B. spec. ZZ–R–601.

U. S. Gov., Federal Specifications Board. 527; 1927. Unlined Linen Fire Hose. The technical requirements of this specification are the same as those of the Underwriters Laboratories for unlined fire hose (flax line) revision of 1927.

References.—Methods of testing. *See also* 200. Standard sizes. *See* 202.0. Fire hose fittings. *See* 974.2. Chemical fire hose. *See* 202.21. Hose duck. *See* 202.0.

202.42 Garden and Ordinary Cold Water Hose

American Marine Standards Committee. O No. 18–1928. 1½-inch Water Hose, Rubber Covered. Construction requirements, dimensions, test requirements for pressure, tension and stretch of rubber tube and cover, adhesion of parts. Substantially in accordance with the Am. Railway Assn. Spec. for "wrapped cold-water hose."

American Railway Assn., Mechanical Division. Recommended Practice; 1927. Wrapped Cold Water Hose. Rubber and cotton reinforcement, construction, tension, stretch, friction and hydrostatic test requirements, standard dimensions.

American Society for Testing Materials. D 177–24; 1924. Wrapped Cold Water Hose. For other than fire department use, construction of rubber hose with cotton duck reinforcement, requirements for tensile strength and elongation of rubber tube and cover, adhesion of plies of reinforcement, and hydrostatic pressure test, using A. S. T. M. test methods D 15, standard sizes and dimensions.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C327; 1927. Selection and Care of Garden Hose. Describes manufacture of 3 types, wrapped, braided, and cotton rubber lined, with simple methods of inspection and making kink test.

U. S. Gov., Federal Specifications Board. ZZ–H–521; 1931. Spray Hose. Requirements on construction, dimensions of 4 sizes up to 1 inch, rubber content of tube and cover, number of reinforcement plies, tensile strength, adhesion of plies, elongation, and set test requirements.

U. S. Gov., Federal Specifications Board. 588; 1928. Braided Water Hose. For rubber hose with cotton braid reinforcement, requirements on dimensions, thickness of tube and cover, number of reinforcement plies, hydrostatic test of hose, adhesion of plies, tensile strength and elongation of rubber tube and cover, set, for ⅝, ¾, and 1 inch sizes, methods of test according to F. S. B. Spec. 59 for rubber goods.

U. S. Gov., Federal Specifications Board. WW–C–623; 1931. Hose Couplings for Garden and Water Hose. Covers lug or ribbed shank type for sizes ½ to 3 inches and slotted expansion type for 1½ inch size only and includes wash-deck hose couplings, requirements on design, strength, detail dimensions, and threading of couplings, assembly, chemical composition of coupling metal, in conformity with F. S. B. spec. QQ–M–151 for metals.

U. S. Gov., Federal Specifications Board. ZZ–H–611; 1930. Wrapped Water Hose. For sizes ¾ to 3 inches of which the 1½-inch size is wash deck hose, requirements on construction and dimensions of cotton reinforced rubber hose, number of plies, general quality and weight of cotton duck, tensile strength, elongation, set, adhesion of parts, and hydrostatic pressure test, testing in accordance with F. S. B. spec. No. 59 and No. 345.

References.—Methods of testing. *See also* 200. Standard sizes. *See* 202.0. Tender and tank hose. *See* 202.45. Suction hose. *See* 202.46. Hose duck. *See* 202.0.

202.43 Radiator Hose

Society of Automotive Engineers. 1931 Handbook. Rubber Hose, Clamps and Fittings; 1916. Inside and outside diameters of hose, inside diameters of clamps, for one to four ply hose, length of fitting.

202.44 Steam and Hot Water Hose

American Marine Standards Committee. O No. 17–1928. Rubber Steam Hose Specification. ¾-inch and 1½-inch sizes, construction, dimensions, inspection, hydrostatic, steam, and adhesion tests.

American Railway Assn. Mechanical Division. Recommended Practice; 1927. Hose, Steam. Rubber with reinforcing cotton, construction, tensile, friction, steaming, deflection, and hydrostatic test requirements.

American Society for Testing Materials. Tentative Specifications. D 54–31T; 1931. Steam Hose. For pressures not exceeding 125 pounds, construction, number of plies of cotton reinforcement, tension and adhesion requirements for rubber inner tube and outer cover, steam and hydrostatic pressure test requirements for hose, size and dimensions, rubber tests in accordance with A. S. T. M. method D 15.

U. S. Gov., Federal Specifications Board. ZZ–H–541; 1931. Steam Hose. For 5 sizes of reinforced rubber hose, requirements on construction and dimensions, number of plies, general quality of cotton duck, tension test and adhesion of plies test before steaming and after steaming, methods of test specified in F. S. B. spec. 59.

U. S. Gov., Federal Specifications Board. WW–C–636; 1931. Steam Hose Couplings. Covers slotted expansion type for ¾ inch size and hexagon shank type for ½ to 1½ inch sizes, requirements on strength, chemical composition of brass metal for various parts, design, assembly, detail dimensions, and threading, in conformity with F. S. B. spec. No. 339a for metals.

References.—Methods of testing. *See also* 200. Standard sizes. *See* 202.0. Radiator hose. *See* 202.43. Hose duck. *See* 202.0. General requirements for metals. *See also* 600.1.

202.45 Tender and Tank Hose

American Railway Assn. Mechanical Division. Recommended Practice; 1929. Hose, Tender Tank. Rubber with cotton and wire reinforcement, construction, tensile, stretch, friction, bend, and steaming test requirements, dimensions.

U. S. Gov., Federal Specifications Board. 46c; 1926. Tender Hose, Corrugated. For rubber hose with imbedded wire and cotton reinforcement, requirements on construction, general quality and weight of cotton duck, tensile strength, elongation, adhesion of parts, and bend test requirements, methods of test in accordance with F. S. B. spec. 59 for rubber goods.

References.—Methods of testing. *See also* 200. Hose duck. *See* 202.0.

202.46 Suction Hose

American Marine Standards Committee. O No. 19–1928. 2½-inch Water Suction Hose, Smooth Bore. Specification on construction, dimensions of hose, cotton and wire reinforcements, test requirements for tension and stretch of rubber parts, adhesion of plies, and bending of hose. Substantially in accordance with Am. Railway Assn. "tender tank hose."

U. S. Gov., Federal Specifications Board. ZZ–H–561; 1930. Water Suction Hose, Smooth Bore. For 10 sizes of cotton and wire reinforced rubber hose up to 12-inch size, requirements on construction, dimensions, number of plies, general quality of cotton duck, size and construction of steel wire helix, fitting equipment, tension test, adhesion of plies, hydrostatic pressure test, content of rubber, methods of test specified in F. S. B. spec. 59 for rubber goods.

References.—Oil suction hose. *See* 202.22. Standard sizes. *See* 202.0. Methods of testing rubber goods. *See also* 200. Hose duck. *See* 202.0.

202.5 METALLIC HOSE

References.—Flexible metallic hose. *See* 607.7.

202.9 MISCELLANEOUS SPECIFICATIONS FOR HOSE

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Hose Clamps, except tank hose, list of recommended standard sizes of hose clamps.

References.—Methods of testing. *See also* 200. Hose duck. *See* 202.0. Dredging sleeves. *See* 209.1.

203. RUBBER FOOTWEAR, GLOVES, AND CLOTHING

203.1 RUBBER BOOTS, SHOES, AND HEELS

203.11 Rubber Boots

U. S. Gov., Federal Specifications Board. 492; 1927. Rubber Hip Boots. Specification covers same general ground as given under F. S. B. 493 for short light rubber boots.

U. S. Gov., Federal Specifications Board. 493; 1927. Short Light Rubber Boots. Requirements on percentage of Hevea rubber and specific gravity for compound for outer sole, upper stocks, heels, and compound for frictions, measurements, weight, finish, thickness of gum parts, structural features, weights of cotton fabric for various parts, vulcanization, methods of test according to F. S. B. spec. 59 for rubber goods.

U. S. Gov., Federal Specifications Board. 494; 1927. Short Heavy Rubber Boots. Specification covers same general ground as given under F. S. B. 493 for short light rubber boots.

References.—Methods of testing rubber goods. *See* 200.

203.12 Rubber Shoes

References.—Leather shoes. *See* 067.1.

203.13 Rubber Heels

203.2 RUBBER GLOVES

American Society for Testing Materials. D 120–23; 1923. Rubber Gloves for Electrical Workers on Apparatus or Circuits not Exceeding 3,000 Volts to Ground. Covers gloves for use with external protection and gloves without such protection, manufacture, high voltage and leakage current test requirements, tensile strength and elongation requirements using A. S. T. M. method D 15, standard sizes and dimensions.

U. S. Gov., Federal Specifications Board. 312; 1925. Rubber Gloves for Electrical Workers. Covers 2 classes for use on voltages up to 3,000. Identical with spec. D 120–23 of Am. Soc. for Testing Materials.

References.—Surgeon's rubber gloves. *See* 204.52. Methods of testing. *See also* 200.

203.3 RUBBER HATS

References.—Cloth hats. *See* 395.2.

203.4 RAINCOATS

References.—Waterproof clothing. *See also* 392.5. Cotton fabrics for rubber coating. *See* 304.71.

203.5 RUBBER APRONS

References.—Surgeons aprons. *See* 204.51. Cotton aprons. *See* 311.92.

204. DRUGGISTS' RUBBER SUNDRIES

204.1 BANDAGES AND PLASTERS

204.11 Rubber Bandages

U. S. Gov., Federal Specifications Board. ZZ-B-101; 1931. Rubber Bandages. Requirements on dimensions, content of rubber, tensile strength, elongation, resistance to hot air, methods of test as specified in F. S. B. spec. 59 for rubber goods.

References.—Methods of testing. *See also* 200. Other surgical dressings. *See* 398.

204.12 Plasters

U. S. Gov., Dept. of Commerce. Bureau of Standards. R85–28; 1928. Adhesive Plaster. Simplified practice recommended and accepted by industry establishing a limited list of standard stock widths and lengths of adhesive tape in rolls and on spools.

U. S. Pharmacopoeial Convention, Inc. Pharmacopoeia of U. S. A.; 1926. Adhesive Plaster. For medicinal purposes, requirements on content of rubber and of zinc oxide where present, thread count and weight of cotton cloth, weight of plaster mass, tensile strength of plaster. Recognized as standard in enforcement of Federal food and drugs act.

References.—*See* references under 204.11.

204.13 Tourniquets

204.2 BAGS, BOTTLES, AND CUSHIONS OF RUBBER

204.21 Bags, Ice

U. S. Gov., Federal Specifications Board. ZZ–I–121; 1931. Rubber Ice Bags. For round or oval bags, requirements on size of filler opening, thickness of wall, rubber content, minimum dimensions, tests for resistance to hot air, leakage, tensile strength and elongation, methods of test as specified in F. S. B. spec. 59 for rubber goods.

U. S. Gov., Federal Specifications Board. ZZ–I–111; 1930. Helmet Shaped Ice Bags. For a combination ice bag and helmet made of rubber coated cotton fabric, requirements on dimensions as helmet and as circular ice bag, thickness of walls, features of fittings, leakage test, in conformity with F. S. B. spec. 59 for rubber goods, F. S. B. spec. 345 for textiles, and F. S. B. spec. ZZ–S–311 for rubber sheeting.

References.—Methods of testing rubber goods. *See* 200. Methods of testing textile fabrics. *See also* 300.4. Rubber sheeting. *See* 204.33.

204.22 Bags, Obstetrical

204.23 Bags and Bottles, Water

U. S. Gov. Federal Specifications Board. ZZ–B–581; 1930. Cloth-Inserted hot Water Bottles. For oblong bottles of rubber sheeting, requirements on construction, capacity, thickness of wall, structural features of throat plug, etc., test for resistance to hot water and to pressure to conform to F. S. B. spec. 59 for rubber goods, F. S. B. spec. 345 for textile materials, and F. S. B. spec. 233 for rubber sheeting.

U. S. Gov., Federal Specifications Board. ZZ–B–586; 1930. Rubber Hot Water Bottles. For sizes 1 to 4 quarts, requirements on thickness of walls, structural features of throat plug, etc., content of new rubber, tensile strength and elongation, boiling water test, hot-air test, and pressure test, methods of test as specified in F. S. B. spec. 59 for rubber goods.

References.—Methods of testing rubber goods. *See* 200. Methods of testing textile fabrics. *See* 300.4. Rubber sheeting. *See* 204.33.

204.24 Rubber Basins

204.25 Rubber Cushions and Pillows

U. S. Gov., Federal Specifications Board. 231a; 1929. Rubber Pillowcases. For white or cream white pillowcases of rubber sheeting, requirements on general quality of sheeting, dimensions and design of pillowcases, to conform to F. S. B. spec. 59 for rubber goods, F. S. B. spec. 345 for textile materials, and to F. S. B. 233 for rubber sheeting.

U. S. Gov., Federal Specifications Board. 232b; 1929. Rubber Air Pillows. For pillows made of rubber sheeting, requirements on dimensions, construction, thickness of sheet, air pressure test, to conform to F. S. B. spec. 59 for rubber goods, F. S. B. spec. 345 for textile materials, and F. S. B. spec. 233 for rubber sheeting.

U. S. Gov., Federal Specifications Board. ZZ–C–791; 1930. Cloth-Inserted Ring Cushions. For inflatable ring cushions of rubber sheeting, requirements on general construction, diameter, width of deflated air pocket, thickness of wall, inflation test, to conform to F. S. B. spec. 59 for rubber goods, F. S. B. spec. 345 for textile materials, and F. S. B. spec. 233 for rubber sheeting.

U. S. Gov., Federal Specifications Board. ZZ–C–796; 1930. Rubber Ring Cushions. For 3 sizes of inflatable rubber ring cushions, requirements on general construction, diameter, width of deflated air pocket, thickness of wall, content of new rubber, tensile strength and elongation, hot air test, and inflation test, methods of test as specified in F. S. B. spec. 59 for rubber goods.

References.—Methods of testing rubber goods. *See* 200. Methods of testing textile fabrics. *See* 300.4. Rubber sheeting. *See* 204.33.

204.26 Fountain Syringes

U. S. Gov., Federal Specifications Board. ZZ–S–901; 1930. Fountain Syringes, Cloth Inserted. For 2-quart size made of rubber sheeting, requirements on general construction, dimensions of tubing, hard rubber connecting pieces and nozzles, content of rubber in tubing, tensile strength and resistance of tubing to hot air, resistance of sheeting to hot water, in conformity with F. S. B. spec. 59 for rubber goods, F. S. B. spec. 345 for textile materials, and F. S. B. spec. ZZ–S–311 for rubber sheeting.

U. S. Gov., Federal Specifications Board. ZZ–S–916; 1930. Rubber Fountain Syringe. For rapid flow 2-quart type, requirements on general construction, thickness of walls, types and dimensions of hard rubber accessories and of tubing, content of rubber, tensile strength and resistance to hot air for syringe and tubing, resistance to hot water for syringe, methods of test as specified in F. S. B. spec. 59 for rubber goods.

References.—Methods of testing rubber goods. *See* 200. Methods of testing textile fabrics. *See* 300.4. Rubber sheeting. *See* 204.33.

204.27 Politzer Bags

U. S. Gov., Federal Specifications Board. ZZ–B–71; 1931. Politzer Bags. For 3 sizes, requirements on shape, thickness of walls of bag, dimensions of tubing, content of rubber, tensile strength and elongation, resistance to hot air, methods of test as specified in F. S. B. spec. 59 for rubber goods.

References.—Methods of testing rubber goods. *See* 200.

204.3 BLANKETS, CLOTH, AND SHEETING

204.31 Rubber Blankets

204.32 Rubber Cloth

References.—Rubber sheeting. *See* 204.33.

204.33 Rubber Sheeting

U. S. Gov., Federal Specifications Board. 233b. (Superseded by ZZ–S–311; 1930.) Rubber Sheeting. For single coated or double coated sheeting, maroon, white, or cream white, supplied in rolls, requirements on length, width, thickness, rubber content, tensile strength, resistance to steam and to phenol, waterproofing qualities, to conform to F. S. B. spec. 59 for rubber goods and 345 for textile materials.

References.—Methods of testing rubber goods. *See* 200. Methods of testing textile fabrics. *See* 300.4.

204.4 DENTAL RUBBER GOODS

U. S. Gov., Federal Specifications Board. ZZ–D–51; 1931. Rubber Dam. For rubber dam supplied in rolls, requirements on thickness, dimensions of rolls, new rubber content, tensile strength, elongation, and resistance to hot air, methods of test as specified in F. S. B. spec. 59 for rubber goods.

References.—Methods of testing. *See* 200. Other dental goods. *See* 915.1.

204.5 SURGEONS' GOODS

204.51 Rubber Aprons

U. S. Gov., Federal Specifications Board. ZZ–A–611; 1930. Rubber Surgeons' Aprons. For rubber coated cotton fabric apron, requirements on dimensions and construction, thickness of coating, weight of straps, to conform to F. S. B. spec. 59 for rubber goods, F. S. B. spec. 345 for textile materials, and F. S. B. spec. 233 for rubber sheeting.

References.—Methods of testing rubber goods. *See* 200. Methods of testing textile fabrics. *See* 300.4. Rubber sheeting. *See* 204.33. Cotton fabrics for rubber coating. *See* 304.71.

204.52 Rubber Gloves and Finger Cots

U. S. Gov., Federal Specifications Board. ZZ–C–571; 1931. Rubber Finger Cots. Requirements on length and weight for small, medium, and large sizes, requirements on tensile strength, elongation, rubber content, aging, and sterilization tests, methods of test as specified in F. S. B. spec. 59 for rubber goods.

U. S. Gov., Federal Specifications Board. 229; 1925. Surgeons' Rubber Gloves. For 7 sizes, requirements on length, width, and weight for 2 weight classes, rubber content, tensile strength, elongation, sterilization, methods of test as specified in F. S. B. spec. 59 for rubber goods.

References.—Other rubber gloves. *See* 203.2. Methods of testing rubber goods. *See* 200.

204.53 Rubber Pads

U. S. Gov., Federal Specifications Board. 230b; 1929. Surgical Operating Pads. For reversible type with apron, made of rubber sheeting, requirements on size, design of pad, inflating cushion, drain apron, and fittings, bursting strength test, to conform to F. S. B. spec. 59 for rubber goods, F. S. B. spec. 345 for textile materials, and to F. S. B. spec. 233 for rubber sheeting.

References.—Methods of testing rubber goods. *See* 200. Methods of testing textile fabrics. *See* 300.4. Rubber sheeting. *See* 204.33.

204.54 Stomach and Colon Tubes

U. S. Gov., Federal Specifications Board. 237; 1925. Stomach or Lavage Tube. For tube or funnel of rubber compound, requirements on finish, general construction, wall thickness, rubber content, tensile strength, elongation, resistance to hot air, methods of test as specified in F. S. B. spec. 59 for rubber goods.

U. S. Gov., Federal Specifications Board. ZZ–T–751; 1930. Colon Tube. For tube made of rubber compound, requirements on dimensions and wall thickness, on rubber content, tensile strength, elongation, and resistance to hot air, methods of test as specified in F. S. B. spec. 59 for rubber goods.

References.—Methods of testing rubber goods. *See* 200.

204.55 Catheters

U. S. Gov., Federal Specifications Board. 222; 1924. Rubber Catheters. For solid tip type with depressed velvet eye, requirements on content of new rubber, tensile strength and elongation, resistance to hot air test, to conform to F. S. B. spec. 59 for rubber goods.

References.—Methods of testing. *See* 200.

204.59 Miscellaneous Surgeons' Goods

References.—Other rubber surgeons goods. *See* 204.1, 204.2, 204.3. Surgical instruments and equipment. *See* 915.2 to 915.5.

204.6 RUBBER TUBING

U. S. Gov., Federal Specifications Board. ZZ–T–831; 1930. Rubber Tubing. Laboratory tubing, pure gum grade and compounded grade, up to 1-inch size, various wall thickness grades and including vacuum connection tubing, requirements on dimensions, content of rubber, tensile strength, elongation and set, accelerated aging test, testing in accordance with F. S. B. spec. ZZ–R–601 for rubber goods.

References.—Methods of testing. *See* 200.

204.9 MISCELLANEOUS RUBBER SUNDRIES

204.91 Rubber Bulbs

204.92 Rubber Cement

U. S. Gov., Federal Specifications Board. 223; 1924. Rubber Cement for Medical Rubber Goods. For new rubber with benzene or naphtha, requirements on rubber content, to conform to F. S. B. spec. 59 for rubber goods.

204.93 Erasers

204.94 Rubber Inflators

204.95 Rubber Stoppers

U. S. Gov., Federal Specifications Board. 383; 1926. Rubber stoppers. Requirements on dimensions of 22 regular sizes and 7 extra long sizes, content of rubber, compressibility, steaming test, acid test, methods of test, to be in conformity with F. S. B. spec. 59 for rubber goods.

References.—Methods of testing. *See* 200.

204.96 Rubber Tips for Crutches

U. S. Gov., Federal Specifications Board. 225; 1924. Rubber Tips for Crutches. For tips molded in one piece with canvas disk at bottom of opening, requirements on thickness of bottom, dimensions and weight of 7 sizes, types of finish, to conform to F. S. B. spec. 59 for rubber goods.

References.—Methods of testing. *See* 200.

205. HARD-RUBBER GOODS

205.1 ELECTRICAL GOODS, HARD RUBBER

American Railway Assn. Signal Section. 8820; 1921. Lead Type Portable Storage Battery for Signaling. Includes hard-rubber jars and covers for batteries, dimensions and construction, high temperature resistance, tensile strength and elongation requirements. Also includes minimum thickness requirements for perforated rubber separators.

Society of Automotive Engineers. 1931 Handbook. Storage Battery Jars for Electric Vehicles; 1921. Tensile strength and elongation requirements of hard rubber for hard-rubber jars, dimensions of 2 and 4 ribbed jars for both passenger cars and trucks.

U. S. Gov., Federal Specifications Board. W–B–131; 1930. Storage Batteries for Ignition, Lighting, and Starting. Includes cell jars and battery case specifications. For hard-rubber cell jars, test requirements for electrical breakdown, tensile strength and elongation; for battery cases, test requirements for distortion, resistance to impact, electrical breakdown, and acid absorption.

References.—Methods of testing rubber goods. *See also* 200. Rubber linemen's gloves. *See* 203.2. Rubber insulation. *See also* 719.55, 719.56.

205.2 LABORATORY APPARATUS, HARD RUBBER

References.—Rubber tubing. *See* 204.6.

205.3 SURGICAL GOODS, HARD RUBBER

205.4 TOILET ARTICLES OF HARD RUBBER

206. RUBBER TIRES, CASINGS, AND TUBES

206.0 GENERAL ITEMS

American Society for Testing Materials. D 122–30; 1930. Tolerances and Test Methods for Tire Fabrics Other Than Cord Fabrics. Tolerances on width, weight, count, thickness, strength, twist, crimp, and bow, test procedure for measurement of above items.

American Society for Testing Materials. D 179–30; 1930. Tolerances and Test Methods for Tire Cord, Woven and on Cones. Standard tolerances on width, weight, count, thickness, tensile strength, elongation and twist, test procedure for measurement of above items.

U. S. Gov., Dept. of Commerce. Bureau of Standards. T318; 1926. Endurance Tests of Tires. Describes the method developed at the bureau for an accelerated endurance test for the tire carcass but not including abrasive resistance test of the tread, size of cleats on test drum and the axle loads used in tests were established in cooperation with the Rubber Assn. of America.

206.1 PNEUMATIC TIRE CASINGS FOR AUTOMOBILES

Society of Automotive Engineers 1931 Handbook. Tires and Rims; 1930. Covers tires and rims for passenger cars, balloon and high pressure tires and rims for commercial vehicles, rim dimensions and standard tire sections for various rim diameters, not including super tires for passenger cars. Same as standards adopted by Tire and Rim Assn.

Tire and Rim Assn. (Inc.) 1931 Year Book. Loads and Inflation Tables; 1931. Maximum loads for various inflation pressures for various tire sizes and number of plies for balloon and high pressure passenger car tires, for balloon and high pressure truck and bus tires.

Tire and Rim Assn. (Inc.) 1931 Year Book. Passenger Car Tires, Truck and Bus Tires. Standard passenger car balloon tire sizes for original equipment with cross sectional limits, proper rims for use with each tire section, current practice on tire, rim, and valve equipment for various car makes. Standard tire sizes and corresponding rim dimensions for truck and bus balloon tires and high pressure tires, dual spacings of truck and motorcoach tires, current practice on tire and valve equipment for commercial cars and trucks.

U. S. Gov., Federal Specifications Board. ZZ–T–381; 1930. Pneumatic Automobile Tires. For high pressure and balloon tires, light and heavy duty types, including truck and bus tires, requirements on construction, minimum number of plies, number of chafing and reinforcing strips, endurance test of tire on standard test wheel, thickness, tensile strength, elongation tests for tread and side walls, hydrostatic test for tire, diameter of inflated tire, methods of test as specified in F. S. B. spec. 59 for rubber goods.

References.—Methods of testing. *See also* 206.0, 200. Tire fabrics. *See also* 303.8. Rims. *See* 722.36.

206.2 PNEUMATIC TIRE CASINGS FOR MOTOR CYCLES, BICYCLES, AND AIRPLANES

Society of Automotive Engineers. 1931 Handbook. Recommended Practice. Airplane Tires; 1929. Actual tire dimensions for plain tread standard and oversize tires with rim dimensions for 10 wheel sizes, tire loads and inflation pressures, tire and wheel combinations with minimum wheel strengths.

Tire and Rim Assn. (Inc.) 1931 Year Book. Airplane Tires, Motor-cycle Tires. Dimensions and standard sizes of airplane tires for tail wheels and landing wheels, load, inflation, and deflection tables, recommended practice on axle, rim, and tire dimensions, load, inflation, and valve equipment for low pressure and extra low pressure airplane tires. Standard tire sizes for motor cycles.

Tire and Rim Assn. (Inc.) 1931 Year Book. Load and Inflation Tables; 1930. Maximum loads for various inflation pressures for various tire sizes for airplane tires and for balloon and high pressure motor-cycle tires.

U. S. Gov., Federal Specifications Board. 3c; 1927. Pneumatic and Solid Rubber Tires and Inner Tubes. For pneumatic tires for motor cycles, requirements on construction, number of plies, of chafing, and of reinforcing strips, endurance test of tire on standard test wheel, thickness, tensile strength, elongation, and set tests for tread and side walls, hydrostatic test, diameter of inflated tire.

U. S. Gov., Federal Specifications Board. 581; 1928. Single Tube and Clincher Bicycle Tires. Requirements on number of plies of cotton or cord fabric, structural features, type of valve, diameter, percentage of new rubber, tensile strength, elongation, thickness, and set for tread, sidewall, and tube, adhesion between plies and rubber, methods of test in accordance with F. S. B. 59 for rubber goods.

References.—*See* references under 206.1.

206.3 INNER TUBES FOR PNEUMATIC TIRES FOR AUTOMOBILES

Tire and Rim Assn. (Inc.) 1931 Yearbook. Valves; 1931. Dimensions of standard sizes of valve stems, straight, bent, etc., for passenger cars, trucks, and buses, including convertible standard valves for truck and bus, recommended bridge washers for truck tubes.

U. S. Gov., Federal Specifications Board. ZZ–T–721; 1930. Automobile and Motorcycle Inner Tubes. For pure gum tubes, compounded tubes, and heavily compounded tubes, requirements on construction and dimensions, on rubber content, tensile strength, elongation, and set, aging and inflation test, methods of test as specified in F. S. B. spec. ZZ–R–601 for rubber goods.

References.—Methods of testing. *See also* 206.0, 200.

206.4 INNER TUBES FOR PNEUMATIC TIRES OTHER THAN AUTOMOBILE

Society of Automotive Engineers. 1931 Handbook. Recommended Practice. Airplane Tire Valves; 1930. Recommended standard dimensions for various sizes and angle of bend for 5 valves.

Tire and Rim Assn. (Inc.) 1931 Yearbook. Valves. Dimensions of standard valve stems for airplane tires and for motor-cycle tires.

U. S. Gov., Federal Specifications Board. ZZ–T–721; 1930. Automobile and Motorcycle Inner Tubes. For pure gum tubes, compounded tubes, and heavily compounded tubes, requirements on construction and dimensions, on rubber content, tensile strength, elongation, and set, aging and inflation test, methods of test as specified in F. S. B. spec. ZZ–R–601 for rubber goods.

References.—Methods of testing. *See also* 206.0, 200.

206.5 SOLID TIRES FOR AUTOMOBILES AND TRUCKS

Society of Automotive Engineers 1931 Handbook. Cushion Tires; 1929. List of standard tire sizes for various wheel diameters, maximum carrying capacity and maximum recommended speeds.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Industrial Truck Tires; 1931. Tire widths and wheel diameters for flat base tires and for channel base tires, for nominal wheel diameters from 5 to 24 inches, dimensions of base bands, maximum loads. In conformity with standards of Tire and Rim Assn.

Society of Automotive Engineers 1931 Handbook. Solid Tires; 1929. Table of standard tire sizes with corresponding wheel diameter, maximum carrying capacity, and maximum recommended speeds.

Tire and Rim Assn. (Inc.) 1931 Yearbook. Solid Tires; 1928. Maximum carrying capacities of solid tires and of cushion tires of various widths and over-all diameters, recommended maximum speed.

Tire and Rim Assn. (Inc.) 1931 Yearbook. Solid Tires for Industrial Trucks; 1930. Standard solid tire sizes and maximum loads for flat base and for channel base tires for wheel sizes from 6 to 24 inches.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R103–29; 1929. Industrial Truck Tires. Simplified practice recommended and accepted by industry establishing a standard limited list of stock sizes covering widths of tires and nominal wheel diameters for flat base tires and for channel base tires, covers solid rubber tires for inside-of-plant trucks.

U. S. Gov., Federal Specifications Board. ZZ–T–391; 1930. Solid Automobile Tires. Requirements on chemical composition and strength of weld of base bands, rubber content, tensile strength, elongation, and rebound value of tread stock, areas of cross-sections, methods of test according to F. S. B. spec. ZZ–R–601 for rubber goods.

References.—Methods of testing. *See also* 206.0, 200. Rims. *See also* 722.36.

207. RUBBER AND BALATA BELTING, PACKING, AND GASKETS

207.0 GENERAL ITEMS

American Society for Testing Materials. D 181–25; 1925. Tolerances for Hose Ducks and Belt Ducks. Tolerances on width for hose duck, rubber and balata belt ducks, and stitched canvas belting ducks, tolerance on weight, tolerance on thread count and gage of hose and belting ducks, tolerances on crimp and tensile strength.

207.1 CONVEYOR BELTING

207.2 ELEVATOR BELTING

207.3 TRANSMISSION BELTING

American Petroleum Institute. Standard No. 1; 1931. Belting Specifications. Balata Belting. For oil country purposes, requirements on construction, elongation, tensile strength, friction test, tolerances on width, methods of test.

American Petroleum Institute. Standard No. 1; 1931. Belting Specifications. Rubber Belting. For oil country purposes, requirements on construction, elongation, tensile strength, friction test, tolerances on width, methods of test.

American Railway Assn. Mechanical Div. Recommended Practice. Belting, Axle Light; 1930. Rubber belting for axle light generator drives, requirements on construction, friction, elongation, tension, and bending test, thicknesses, tolerance on width, tested in conformity with A. R. A. standard methods of tests for rubber goods.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Canvas and Rubber Driving Belts; 1923. Length tolerance, driven pulley diameters for various ply belts, belt-duck weight and stitching requirements, horsepower ratings for various belt widths and number of plies, test requirements on separation of plies in rubber belting.

References.—Methods of testing. *See also* 200. Belt duck tolerances. *See* 207.0. Leather belting. *See* 066.3. Cotton belting. *See* 314.1.

207.4 PACKING AND GASKETS

References.—Rubber gaskets, rubber packing. *See* 707.13, 707.24.

208. MISCELLANEOUS RUBBER PRODUCTS

208.1 RUBBER FLOOR COVERING

American Society for Testing Materials. D 178–24; 1924. Rubber Matting for Use Around Electrical Apparatus or Circuits not Exceeding 3000 Volts to Ground. Construction, tensile strength and elongation requirements using A. S. T. M. test method D 15, test requirements for voltage and dielectric strength tests, minimum thickness.

U. S. Gov., Federal Specifications Board. 382; 1926. Rubber Matting. For a layer of rubber backed with cotton sheeting, requirements on width, thickness and length of roll, size of corrugations, general quality, tensile strength and elongation of rubber compound, weight, thread count and strength of cotton fabric, flexibility, adhesion of backing, testing in accordance with F. S. B. spec. 59 for rubber goods and F. S. B. spec. 345 for textile materials.

U. S. Gov., Federal Specifications Board. 414; 1926. Rubber Matting for Use Around Electrical Apparatus. For circuits not over 3,000 volts, requirements on general quality and construction of matting, thickness, tensile strength, elongation, set, dielectric strength, conductivity test, methods of test with physical test according to F. S. B. specification 59.

References.—Methods of testing. *See also* 200.

208.2 RUBBER BANDS

U. S. Gov., Federal Specifications Board. ZZ–B–111; 1931. Rubber Bands. For 20 sizes, requirements on dimensions, tensile strength, elongation, aging test, content of new rubber, methods of test as in F. S. B. spec. 59 for rubber goods.

References.—Methods of testing. *See* 200.

208.3 RUBBER CEMENT AND COMPOUNDS

References.—Rubber cement. *See* 204.92.

208.4 RUBBER INSULATION

References.—Rubber battery jars. *See* 205.1. Rubber floor covering. *See* 208.1. Rubber gloves. *See* 203.2. Rubber covering for electric wires. *See* 719.55. Rubber tape, friction tape. *See* 719.55, 719.56.

208.5 RUBBER TUBING

References.—Rubber tubing. *See* 204.6.

208.6 RUBBER JAR RINGS

U. S. Gov., Federal Specifications Board. 51; 1922. Rubber Jar Rings. For 1 size, requirements on dimensions, tensile strength, elongation, boiling water test, steam pressure test, and dry heat test.

208.9 MISCELLANEOUS MECHANICAL RUBBER GOODS

208.91 Bumpers of Rubber

208.92 Ear Cushions

208.93 Expansion Joints

208.94 Pads

References.—Rubber surgical pads. *See* 204.53.

208.95 Rubber Washers

209. MISCELLANEOUS RUBBER MANUFACTURES

209.1 DREDGING SLEEVES

U. S. Gov., Federal Specifications Board. 42; 1922. Dredging Sleeves. Sleeves for hydraulic dredges, requirements on construction for rubber sleeves with cotton reinforcement, weight, and quality of canvas reinforcement, minimum thickness of hose, tensile strength, adhesion of plies, ultimate elongation, methods of test specified in F. S. B. spec. 59 for rubber goods.

References.—Methods of testing. *See also* 200. Hose duck. *See* 202.0.

209.2 HORSESHOE PADS

209.4 PLUMBERS' FORCE CUPS

209.5 SQUILGEES

209.6 WEATHER STRIPPING

209.7 GROMMETS OR BUSHINGS

Society of Automotive Engineers 1931 Handbook. Rubber Bushings 1929. Dimensions of rubber bushings or grommets up to 1-inch size for bushing holes in sheet metal.

209.8 RUBBER HOSE TIPS

209.9 MISCELLANEOUS RUBBER GOODS

209.91 Rubber Balls

Amateur Athletic Union of the U. S. Official Athletic Rules; 1931. (Publ. No. 117R of American Sports Publishing Co., 45 Rose St., New York, N. Y.) Code Ball. For spherical inflated rubber ball, requirements on diameter, weight, and pressure resistance capacity.

National Collegiate Athletic Assn. Water Polo Rules; 1930. (Publ. No. 91R of American Sports Publ. Co., 45 Rose St., N. Y.) Ball. Regulation white rubber ball, standard diameter and tolerances, requirements on inflation and freedom from oil and grease.

U. S. Golf Assn. (Publ. 3X of American Sports Publ. Co., 45 Rose St., N. Y.) Playing Rules; 1930. Weight and Size of Golf Ball. Permissible weight and minimum diameter. The new weight and diameter effective after Jan. 1, 1931, are also given.

U. S. Intercollegiate Lacrosse Assn. Lacrosse Rules; 1930. (Publ. No. 113R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Ball. To be of India rubber sponge, requirements on circumference and weight, tolerances.

209.92 Ice Hockey Puck

Amateur Athletic Union of the U. S. Official Athletic Rules; 1931. (Publ. No. 117R of American Sports Publishing Co., 45 Rose St., New York, N. Y.) Ice Hockey. For the puck, requirements on thickness, diameter, and weight of hardened vulcanized rubber puck.

National Collegiate Athletic Assn. Ice Hockey Rules; 1930. (Publ. No. 92R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Puck. To be of black vulcanized rubber, requirements on standard thickness, diameter, weight, freedom from identations and cuts.

National Hockey League. Laws of Hockey; 1929. (Publ. No. 90R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Puck. To be of vulcanized rubber, required thickness and diameter.

209.99 Rubber Goods not Elsewhere Classified

References.—Rubber pump-valves. *See* 707.3. Rubber gas masks. *See* 993.

210–219 GUMS, RESINS, AND BALSAMS

211. TURPENTINE, TAR, AND PITCH

211.1 TURPENTINE

American Pharmaceutical Assn. National Formulary; 1926. Turpentine. Description and physical properties, test requirements for purity and identity. Recognized as standard in enforcement of Federal food and drugs act.

American Railway Assn. Mechanical Division. Recommended Practice; 1925. Turpentine. Applies to gum or spirits turpentine as well as to wood turpentine. Appearance, specific gravity, refractive index, residue after polymerization, boiling point, distilling point, methods of test.

American Society for Testing Materials. D 13–26; 1926. Gum Spirits of Turpentine and Steam Distilled Wood Turpentine. Requirements on appearance, color, odor, specific gravity, refractive index, residue, boiling point, distillation according to A. S. T. M. methods of test D 233.

American Society for Testing Materials. D 233–26; 1926. Methods of Sampling and Testing Turpentine. Methods of sampling from tank cars and containers, construction of distilling apparatus, procedure for distilling test, test method for color, polymerization test and preparation of reagent.

American Society for Testing Materials. D 236–27; 1927. Destructively Distilled Wood Turpentine. Requirements for specific gravity, refractive index, residue, boiling point, distillation test according to A. S. T. M. test methods D 233.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Turpentine Oil (Spirits of Turpentine). Tentative method for determination of color, specific gravity, refractive index, distillation, official method for determination of mineral oil.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. Misc. Cir. No. 22; 1924, and Supplements 1 to 5, incl., 1929. The Naval Stores Act and Regulations for Its Enforcement. Turpentine. General definitions as regards source or method of production of gum spirits of turpentine, steam distilled wood turpentine, destructively distilled wood turpentine, and sulphate wood turpentine. Text of pertinent portions of act. Use of above designations for transactions in turpentine required by law.

U. S. Gov., Federal Specifications Board. LLL-T-791; 1931. Turpentine. For gum spirits of turpentine and steam distilled wood turpentine, requirements on appearance, odor, specific gravity, refractive index, qualities of residue after polymerization, boiling point, distillation test, methods of inspection and test.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Oil of Turpentine. Source, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

211.2 PINE-TAR OIL

211.3 PINE OIL

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Oil of Dwarf Pine Needles. Physical properties, identity tests, test requirements for purity and for strength. Recognized as standard in enforcement of Federal food and drugs act.

211.4 TAR (NOT INCLUDING COAL TAR)

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Pine Tar. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

212. CAMPHOR

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Camphor. Description and properties, preparation and standard strengths of tincture, dilutions, medications, triturations, and saturated tincture for medicinal purposes.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Camphor and Monobromated Camphor in Tablets. Methods for preparation of sample and reagents, and for determination of amount of camphor.

U. S. Pharmacopoeial Convention (Inc.), Pharmacopoeia of U. S. A.; 1926. Camphor. For medical purposes, physical properties, identity tests, test requirements for purity, dosage. Recognized as standard in enforcement of Federal food and drugs act.

213. CHICLE

214. BALSAMS

U. S. Pharmacopoeial Convention (Inc.) Pharmacopoeia of U. S. A.; 1926. Balsam of Peru. Balsam Copaiba. Balsam of Tolu. For medical purposes, physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.) Pharmacopoeia of U. S. A.; 1926. Storax. A balsam for medical purposes, physical properties, identity tests, test requirements for purity, dosage. Recognized as standard in enforcement of Federal food and drugs act.

215. VARNISH GUMS AND RESINS

References.—Varnish gums and resins. *See also* 846.6. Rosin. *See* 216.

216. ROSIN

American Society for Testing Materials. D 269–30; 1930. Method of Test for Determination of Toluol Insoluble Matter in Rosin. Treatment of sample and test procedure for determination of matter insoluble in toluol, chiefly sand, chips, dirt and bark.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Rosin. Tentative method for determination of toluol-insoluble material in rosin.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. Misc. Cir. No. 22. 1924, and Supplements 1 to 5, incl.; 1929. The Naval Stores Act and Regulations for Its Enforcement. Rosin. Definitions of gum rosin and of wood rosin, type standards for 15 grades of rosin are in custody of Dept. of Agriculture, the use of which are mandatory in commercial transactions in rosin. Includes text of pertinent portions of act.

U. S. Pharmacopoeial Convention (Inc.) Pharmacopoeia of U. S. A.; 1926. Rosin. Source, physical properties, identity tests, purity requirements. Recognized as standard in enforcement of Federal food and drugs act.

217. MISCELLANEOUS GUMS, BALSAMS, AND RESINS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Drugs. Tragacanth. Tentative method for determination of volatile acidity.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 45. Gum Arabic Sizing. Requirements on kinds and amounts of constituents, directions for preparation.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Gum Arabic (Acacia). For medical purposes, physical properties, identity tests, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Gum Tragacanth. For medical purposes, physical properties, identity tests, test requirements for purity.

220–229 CRUDE DRUGS AND ESSENTIAL OILS

221. CRUDE DRUGS OF VEGETABLE ORIGIN

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Lists several hundred drugs, including crude drugs of vegetable origin, with names and synonyms, description of plant, its habitat, and the part used for drug purposes, with method of preparation and standard strengths of medicinals prepared therefrom.

American Pharmaceutical Assn. National Formulary; 1926. Covers standards for crude drugs of vegetable origin that are not included in U. S. Pharmacopoeia, gives descriptions and physical properties, permissible foreign organic matter, formulas for and preparation of elixirs, extracts, liniments, solutions, etc., from the crude drugs. Recognized as standard in enforcement of Federal food and drugs act.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Santonica (Levant Wormseed). Tentative tests for determination of percentage of santonin.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. 630 Drugs and Medicinals Including those of Vegetable Origin. Source, physical properties, identity tests, test requirements for purity, dosage. Recognized as standards in enforcement of Federal food and drugs act.

References.—Medicinal and pharmaceutical preparations. *See also* 810–819.

222. DRUGS OF VEGETABLE ORIGIN OTHER THAN CRUDE

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the United States; 1914. Lists several hundred drugs, mostly plant drugs, gives names and synonyms, description of plant, its habitat, the part used for drug purposes, the methods of preparation and standard strengths of tinctures, dilutions, medications, triturations, etc., as used in homeopathic medicine.

American Pharmaceutical Assn. National Formulary; 1926. Contains standards for crude drugs and chemicals and for medicinal preparations made from them, that are not included in U. S. Pharmacopoeia. Recognized as standards in enforcement of Federal food and drugs act.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Drugs. Methods for separation, identifying, and determination of percentages of the potent ingredients for 56 drugs including several alkaloids.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. 630 Drugs and Medicinals including those of Vegetable Origin. Source, physical properties, identity tests, test requirements for purity, dosage. Recognized as standards in enforcement of Federal food and drugs act.

References.—Medicinal and pharmaceutical preparations. *See also* 810–819.

223. ESSENTIAL AND DISTILLED OILS

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. 630 Drugs and Medicinals including Essential and Distilled Oils. Physical properties, identity tests, test requirements for purity and in some cases for strength, dosage. Recognized as standards in enforcement of Federal food and drugs act.

References.—Medicinal oils. *See* 813. Vegetable oils. *See* 142.

230–239 DYEING AND TANNING MATERIALS OF VEGETABLE ORIGIN

231. TANNING MATERIALS

American Chemical Society. Standard Methods for the Sampling and Analysis of Commercial Fats and Oils; 1926. Published by American Oil Chemists Society. Applicable to fats and fatty oils used in the tanning industry, methods of sampling, apparatus and methods of determination of moisture, volatile matter, insoluble impurities, soluble mineral matter, fatty acids combined, free fatty acids, titer, saponification number, unsaponifiable matter, iodine number, melting point, softening point, slipping point, flow test, cloud test, bleach test, Reichert-Meissl and Polenske numbers, Kirschner value, index of refraction, specific gravity, acetyl value, open-cup flash and fire test, standard color for commercial fat.

American Leather Chemists Assn. Methods of Sampling and Analysis; 1930. Chrome Tanning Materials. Provisional methods of analysis for chromium, acid content, and basicity.

American Leather Chemists Assn. Methods of Sampling and Analysis; 1930. Provisional Method for the Determination of Sugars in Tanning Materials. Methods for determination of reducing sugars, total sugars, and nonreducing sugars.

American Leather Chemists Assn. Methods of Sampling and Analysis; 1930. Official Method of Sampling Tanning Materials. For solid, powdered and pasty extracts, for liquid extracts in barrels, in bulk, and in tank cars, for crude tanning materials, for spent materials from leaches, for tanning liquors.

American Leather Chemists Assn. Methods of Sampling and Analysis; 1930. Provisional Method for Sampling Tanning Material. Requirements on number of packages to be sampled, method of taking samples of solid extract, quebracho, mangrove, wattle, etc., methods of sampling pasty extracts, powdered extracts, bark and wood in sticks, wood chips, fruits, roots, spent tanning materials, liquid extracts.

American Leather Chemists Assn. Methods of Sampling and Analysis; 1930. Vegetable Materials Containing Tannin. Official methods of analysis for raw and spent materials, analysis of extract for total solids, water, soluble solids, insolubles, nontannins, and tannins, analysis of liquor for total solids, soluble solids, insolubles, and nontannins, and total acidity of liquors, test for presence of sulphite cellulose.

American Leather Chemists Assn. Methods of Sampling and Analysis; 1930. Vegetable Materials Containing Tannin. Official international method of analysis being a provisional method of analysis of the A. L. C. A., comprising methods of sampling, determination of moisture, total solids, solubles, nontannins, tanning matter absorbable by hide powder, insoluble matter, and specific gravity.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Tanning Materials, Tentative Methods Essentially the same as methods of Am. Leather Chemists Assn. Preparation of solution, determination of total solids, soluble solids, and tannin for extracts and liquors; for raw and spent materials, determination of moisture, extracting and analysis of extract.

References.—Synthetic tanning materials. *See* 809.1.

232. DYEING MATERIALS

References.—Coal-tar dyes. *See* 803.1.

233. EXTRACTS FOR DYEING

234. TANNING EXTRACTS

References.—Tanning materials. *See* 231.

240–249 SEEDS

(Except Oil Seeds and Spice Seeds)

240. GENERAL ITEMS

Assn. of Official Seed Analysis of North America and U. S. Dept. of Agriculture. Department Circular 406; 1928. Rules for Seed Testing. Methods of sampling, sizes of test samples for various kinds of seed, requirements on methods of purity analysis, and germination tests, including requirements for type of substratum, temperatures and duration of test for different kinds of seed.

241. ALFALFA, CLOVER, AND TIMOTHY SEEDS

242. GRASS SEEDS

243. FORAGE PLANT SEEDS

244. FLOWER SEEDS

245. CABBAGE AND TURNIP SEEDS

246. GARDEN SEEDS, EXCEPT CABBAGE AND TURNIP

250–259 NURSERY AND GREENHOUSE STOCK

251. BULBS AND ROOTS

American Assn. of Nurserymen. Horticultural Standards; 1923. Herbaceous Perennials. Requirements on minimum number of buds in clump, required statement on method of propagation, age, and number of buds.

259. MISCELLANEOUS NURSERY AND GREENHOUSE STOCK

American Assn. of Nurserymen. Horticultural Standards; 1923. For deciduous trees, standard increments for stating height, caliper, and diameter of top, location of point of caliper measurement, bundling of fruit trees, combination caliper and minimum heights for deciduous trees and for fruit trees, standard plant names.

American Assn. of Nurserymen. Horticultural Standards. 1923. Evergreen Trees. Standard increments for stating heights and spread.

American Assn. of Nurserymen. Horticultural Standards, 1923 and Supplement, 1930. Rose Grades. Classification of roses into 4 classes, definitions of 2 grades for each class dependent on number and length of canes.

American Assn. of Nurserymen. Horticultural Standards, 1923 and Supplement, 1930. Shrub Grades. Standard increments for stating heights and diameter, classification of various varieties into 6 classes including dwarf and tree form, grades for each class dependent on number of canes and height.

American Assn. of Nurserymen. Horticultural Standards; 1923. Vines. Standard increments for stating length, required statement of age and average number of stems.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Asparagus Plumosus; 1930. A permissive standard of trimmed asparagus sprays including definitions of 3 grades as regards shape, freedom from shattering, second growths, and damage, color of foliage, size classification.

260–269 TOBACCO

260. GENERAL ITEMS

U. S. Gov., Congress. Public, No. 661, 70th Congress; 1929. Tobacco Stocks and Standards Act. An act to provide for the collection and publication of statistics of tobacco by the Dept. of Agriculture. Authorizes the Sec. of Agriculture to establish standards for the classification of tobacco and requires holders of tobacco other than original grower to report stock of tobacco according to these standards.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Service and Regulatory Announcement No. 90; 1925. Regulations of Secretary of Agriculture under U. S. Warehouse Act of 1916. Regulations for Warehousemen Storing Tobacco. Regulations regarding warehouse licenses and bonds, warehouse receipts, duties of warehousemen, fees, licensed samplers, graders, and weighers, tobacco classification at licensed warehouses using such official standards of U. S. as have been adopted. Includes a copy of U. S. warehouse act.

261. TOBACCO UNMANUFACTURED

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Summary of Standard Tobacco Grades for U. S. Types 11, 12, 13, and 14; 1931. For reporting stocks of leaf tobacco under tobacco stocks and standards act for tobacco produced in Virginia, North Carolina, South Carolina, Georgia, and Florida, list of 80 standard grades of flue cured tobacco arranged in groups with quality grade and color combinations under each of the group wrappers, heavy leaf, thin leaf, etc., no definitions of quality grades or group classification.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Standard Grades for Wisconsin Tobacco (U. S. Types 54 and 55); 1931. Grade definitions according to group, quality, color, and length; groups comprising binders, fillers, scrap, nondescript, etc.; quality dependent on smoothness, texture, elasticity, oiliness, firmness, thinness of body, strength, etc.; color classification for each group.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 118; 1929. Classification of leaf tobacco covering classes, types, and groups of grades, issued under authority of the tobacco stocks and standards act. Leaf tobacco divided into following classes, flue cured, fire cured, air cured, cigar filler, cigar binder, cigar wrapper, misc. domestic types, foreign grown cigar leaf types, foreign grown other than cigar leaf types, division of each class into types with type names and places of production, grade groups applicable to each type, such as heavy leaf, thin leaf, seconds, etc., definition of grades not included. Includes text of tobacco stocks and standards act.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Misc. Circ. No. 83; 1926. U. S. Standard Tobacco Sizes. Standards for use under U. S. warehouse act and permissive for other purposes, definitions of 6 classes of standard sizes, as 1-inch sizes, 2-inch sizes, etc., in which the distance between upper and lower limits of length are 1-inch, 2-inch, etc., numerals for designating the various standard length sizes, types of tobacco to which the various classes of grading are applicable, charts and illustrations of sizing boards and sizing tables for use in grading tobacco.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Summary of Standard Tobacco Grades for U. S. Type 21; 1929. For reporting stocks of leaf tobacco under tobacco stocks and standards act, covers 50 grades of Virginia fire-cured tobacco arranged in groups as wrappers, heavy leaf, thin leaf, etc., with color, quality grade, and size combination for each grade, no definitions of quality grade or group classification.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Summary of Standard Tobacco Grades for U. S. Type 23; 1929. For reporting stocks of leaf tobacco under tobacco stocks and standards act, covers 46 grades of western fire-cured tobacco, arranged in groups as wrappers, heavy leaf, thin leaf, etc., with color and quality grade for each grade, no definitions of quality grades or group classification.

References.—Warehousing regulations. *See* 260.

262. MANUFACTURES OF TOBACCO

262.1 CIGARETTES

262.2 CIGARS

262.3 CHEWING TOBACCO

262.4 NICOTINE INSECTICIDES

References.—Nicotine insecticides. *See* 881.24.

280–289 STARCH AND VEGETABLE GLUE

281. STARCH

References.—Cornstarch. *See* 103.3.

282. VEGETABLE GLUE

References.—Glue of animal origin. *See* 093. Mucilage made from gum acacia. *See* 932.5.

290–299 MISCELLANEOUS VEGETABLE PRODUCTS

291. IVORY, VEGETABLE, OR TAGUA NUTS

292. MOSS, SEAWEED, AND VEGETABLE SUBSTANCES

293. FIBER SPONGES

294. BROOM CORN

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. U. S. Standards for Broomcorn; 1931. A permissive standard, definitions of 5 grades as regards color, absence of flat fiber, and permissible defects, classification definitions for hurl, self-working, and underwork divisions, classification into whisk, parlor, and warehouse.

300–399 TEXTILES

300–309 COTTON, COTTON FABRICS, AND KNIT GOODS

300. GRADES, DEFINITIONS, AND TESTS OF COTTON

300.0 GENERAL ITEMS

U. S. Gov., Congress. 39 Stat. 476, 1916. Amended 40 Stat. 1348, 1351, 41 Stat. 725, and Public No. 657, 69th Cong.; 1927. U. S. cotton futures act. To avoid payment of tax on cotton sold for future delivery certain requirements are laid down, including sale of cotton by official grades established by Sec. of Agriculture, adjustment of price where grade delivered is not the grade specified in contract or is not middling where no grade is specified, and disallowance of delivery of cotton below a prescribed range in the official standards.

U. S. Gov., Congress. 42 Statutes at Large, p. 1517; 1923. U. S. cotton standards act. Makes it unlawful for anyone to indicate the grade of cotton, in connection with any transaction or shipment in commerce, by other than the official cotton standards of the U. S. then in effect, but not applicable to transactions by sample, authorizes Sec. of Agriculture to license graders and to establish official cotton standards.

U. S. Gov., Congress. 43 Stat. 822, 844–845; 1925. An act making appropriations for the Dept. of Agriculture for the fiscal year ending June 30, 1926. For enabling the Sec. of Agriculture to investigate and certify to shippers and other interested parties the class, quality, and/or condition of cotton and fruits, vegetables, poultry, butter, hay, when offered for shipment in interstate shipment or when received at designated central markets.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Service and Regulatory Announcements No. 126; 1931. Regulations of Secretary of Agriculture under U. S. warehouse act of 1916. Regulations regarding warehouse licenses and bonds, warehouse receipts, duties of warehouseman, fees, licensed classifiers and weighers, cotton classification for licensed warehouses using official cotton standards of U. S. and including definitions of irregularities, such as perished staple, immature staple, gin-cut cotton, etc. Includes a copy of U. S. warehouse act.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Service and Regulatory Announcement No. 124; 1931. Regulations of the Sec. of Agriculture under the U. S. cotton futures act. Regulations regarding classification requests, inspection and sampling, classification, cotton class certificates, supervision of transfer of cotton, list of official cotton standards ,etc. Includes text of U. S. cotton futures act.

References.—Lime for Use in Textile Industry. *See* 517.2 Coal-tar dyes. *See* 803.1

300.1 U. S. STANDARDS FOR GRADES OF COTTON

Arkwright Club and New England Cotton Buyers' Assn. New England Terms for Buying and Selling American Cotton: 1929. Includes definitions of short staple and of long staple cotton, trading regulations using U. S. Government standard classification, not applicable to sea island or American grown Egyptian cotton.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Service and Regulatory Announcements No. 92; 1925. Standards for Cotton Classification in the United States and Abroad. Includes official cotton standards of the U. S. for grades and colors of American upland cotton, known as the Universal Standards for American Cotton. Grade and color are defined by samples in custody of U. S. Dept. of Agriculture for 9 grades of white cotton, 5 grades of yellow tinged, 3 grades of yellow stained, and 3 grades of blue stained, with descriptive definitions for 12 intermediate grades.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Service and Regulatory Announcements No. 92 and No. 94; 1925. Official Standards of the United States for American Cotton Linters. The standards are published in each of above publications. Grade defined for 7 grades by samples in custody of Dept. of Agriculture, definitions of hull fiber, mixed packed, and off grade grades.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Service and Regulatory Announcements No. 109; 1928. Items relating to the administration of the U. S. cotton futures and cotton standards acts. Includes standards for color for American cotton linters. Definitions of 7 color grades as embraced in the colors of the samples composing official standards of U. S. for cotton linters.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Service and Regulatory Announcements No. 117; 1929. Proceedings of International Universal Cotton Standards Conference of 1929 and items relating to the administration of the U. S. cotton futures and cotton standards acts. Includes official cotton standards of the U. S. for grades and colors of American Egyptian cotton, effective Aug. 1, 1930. Grade and color for 5 grades defined by samples in custody of Dept. of Agriculture, definitions of repacked, false packed, mixed packed, and water packed grades.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Service and Regulatory Announcements No. 117; 1929. Proceedings of International Universal Cotton Standards Conference of 1929 and items relating to the administration of the U. S. cotton futures and cotton standards acts. Includes additional official cotton standards of the U. S. for extra white cotton grades of upland cotton, effective Aug. 1, 1930. Grade and color defined by samples in custody of Dept. of Agriculture for 7 grades.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Service and Regulatory Announcements No. 117; 1929. Proceedings of International Universal Cotton Standards Conference of 1929 and items relating to the administration of U. S. cotton futures and cotton standards acts. Includes official cotton standards of the U. S. for length of staple, last amended in 1929. Definition of staple length and conditions of measurement, list of standard lengths for designating length of staple, the standard lengths for 17 grades of upland and for 4 grades of American Egyptian are represented by samples in custody of Dept. of Agriculture.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Service and Regulatory Announcements No. 117; 1929. Proceedings of International Universal Cotton Standards Conference of 1929 and items relating to the administration of the U. S. cotton futures and cotton standards acts. Includes tentative standards for preparation of long staple cotton, use in spot transactions permitted. Three preparations in each of grades 4, 5, and 6 of upland cotton defined by samples in custody of Dept. of Agriculture.

References.—Laws and regulations establishing cotton grades. *See* 300.0.

300.4 GENERAL METHOD OF TESTING COTTON FABRICS

American Assn. of Textile Chemists and Colorists, 1930 Yearbook. Standard Tests for Fastness to Acids and Alkalies and Selection of Standards. For dyed cotton, dyed silk, and dyed wool, methods of test and classification of material according to resistance to tests.

American Assn. of Textile Chemists and Colorists. 1930 Yearbook. Report of Subcommittee on fastness to carbonizing. Usual methods of laboratory tests using method with acid and method with aluminum chloride.

American Assn. of Textile Chemists and Colorists. 1930 Yearbook. Report of subcommittee on fastness to crocking. Tentative method of test using manual procedure and wet and dry white cloths, classification of materials according to resistance to tests.

American Assn. of Textile Chemists and Colorists. 1930 Yearbook. Report of subcommittee on fastness to sea water. Method of test, requirements on composition of artificial sea water.

American Assn. of Textile Chemists and Colorists. 1930 Yearbook. Fastness Tests for Dyed or Printed Cotton. Standard methods of test for fastness to domestic washing, laundering and soaping using standard launder-ometer and alternate method without launder-ometer; fastness to fulling of dyed cotton against white cotton; silk and wool; fastness to chlorine; fastness to stoving; classification of materials according to resistance to tests; dyes and dyeings chosen as comparison standards for the various classifications.

American Assn. of Textile Chemists and Colorists. 1930 Yearbook. Fastness Tests for Dyed or Printed Rayon, Celanese, and Similar Fibers. Standard methods of test for fastness to domestic washing and laundering using the launder-ometer, classification of material according to degree of resistance to tests.

American Assn. of Textile Chemists and Colorists. 1930 Yearbook. Fastness Tests for Dyed Silk. Standard methods of test for fastness to domestic washing and laundering using launder-ometer, fastness to fulling, fastness to degumming of dyed silk, fastness to stoving silk, classification of materials according to degree of resistance to tests, dyes chosen as standard for various classifications.

American Assn. of Textile Chemists and Colorists. 1930 Yearbook. Fastness Tests for Dyed Wool. Standard methods of testing of fastness to washing or laundering of dyed woolen material using launder-ometer, fastness to fulling, scouring and mill washing, fastness to dry and wet heat, fastness to stoving, classification of materials according to resistance to tests, dyes and dyeing chosen as comparison standards for various classifications.

American Assn. of Textile Chemists and Colorists. 1930 Yearbook. Report of subcommittee on light fastness. Recommended procedure for standard sun test, approximate relation between time periods for sun exposure and for exposure in fade-ometer using artificial light.

American Assn. of Textile Chemists and Colorists. 1930 Yearbook. Report of subcommittee on standard methods of determining sizing and finishing materials in textile fabrics. Tentative method for determination of quantity of moisture, oils, fats and waxes, soap, total sizing or filling and finishing materials, in cotton cloth.

American Society for Testing Materials. D 39–27; 1927. Approved by American Standards Assn. as L5–1931. Methods of Testing Woven Textile Fabrics. Method of testing for length, width, weight, number of threads per inch, thickness, tensile strength, and crimp.

American Society for Testing Materials. D 274–29; 1929. Tolerances and Test Methods for Certain Light and Medium Cotton Fabrics. For print cloth, sheeting, pillow tubing, carded lawn, pajama checks, bunting, denims, drill, twill, cotton flannel, buckram, and blanket cloths, accuracy of width measurement, tolerances on specified average width, weight, and thread count, tensile strength not less than specified, tests according to A. S. T. M. method D 39.

American Society for Testing Materials. Tentative Methods. D 276–31 T; 1931. Methods for Identification of Textile Fibers and Their Quantitative Determination in Mixed Goods. General characteristics, appearance, and illustrations of principal textile fibers, qualitative identification by dyeing and burning, complete chemical quantitative analysis for percentages of each material in cotton and wool mixtures, cotton, silk and wool mixtures, etc., identification tests for various kinds of rayons.

American Society for Testing Materials. Tentative Standard. D 337–31 T; 1931. Methods of Determining Relative Humidity. Definitions of absolute humidity, relative humidity, etc., requirements on apparatus and test procedure, required accuracy of measurement.

National Assn. of Dyers and Cleaners. Fabric Testing. Undated. Small wall chart with tests for distinguishing different kinds of fabric; or different threads in one fabric; for pure silk, a burning test; for weighted silk, a burning test; for pure wool, a burning test; for cellulose acetate, a burning and chemical test; for cotton, linen, ramie, china grass, artificial wool, rayon, a burning test.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 5 To Determine the Amount of Wool and Cotton in Fabric. Test procedure using method of weighing, boiling out wool in caustic solution, washing, drying and reweighing.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 3. To Determine the Amount of Wool, Silk, and Cotton in Fabric. Test procedure using method of weighing before and after dissolving-out the silk in ammoniacal nickel hydrate, and again after dissolving-out the wool in caustic potash.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 4. To Determine Amount of Silk and Cotton in a Fabric. Test procedure using method of weighing before and after dissolving the cotton in zinc chloride solution.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 5. To Determine the Amount of Cotton and Linen in Fabric. Test procedure using method of weighing before and after treating with sulphuric acid and washing out the cotton.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test

No. 9. To Estimate Amount of Sizing or Dressing Materials in Fabrics. Test procedure using method of treating sample in prescribed strengths of hydrochloric acid and of soda ash solution, for removing sizing and dressing, weighing sample before and after treatment.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 10. To Determine if Cotton Has Been Mercerized. Test proceduce using fading of color reaction after steeping sample in Lange's iodine and zinc chloride solution.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 20. To Determine the Class of Dye in Fabric. Test methods for the dyes turkish red, para red, direct red (benzo, diamine, congo, etc.), sulphur black, aniline black, and logwood black, test for direct colors and for basic colors, to distinguish sulphur from indigo blue, sulphur from mineral khaki, and indigo blue from indanthrene blue.

National Assn. of Finishers of Cotton Fabrics. Methods for Testing Cotton Fabrics to Determine Their Fastness to Light and Power Laundry Washing. Undated. Description of fade-ometer and launder-ometer, test procedure and classification of samples in accordance with the resistance to light and laundering obtained from using above apparatus under prescribed conditions.

U. S. Gov., Dept. of Commerce. Bureau of Standards. RP61; 1929. A Multiple Strand Test for Yarns. Describes method of preparing test specimen and test procedure using multiple strands of yarn under uniform tension, test gives breaking strength and also the stress-strain relationship. Comparison is made with tentative specification D258–31T of Am. Soc. for Testing Materials. *See* page 99.

U. S. Gov., Federal Specifications Board. 345a; 1929. Textile Materials. Methods of physical and chemical tests, requirements on conditions of temperature and humidity, methods of identification and quantitative determination of fiber in cotton, wool, and mixed goods, test methods of breaking strength, weight, thread count, width, fastness of color, shrinkage, and per cent sizing

References.—Textile testing machines. *See* 770. Coal tar dyes and colors. *See* 803.1. Other textile tests and methods. *See* the individual textile.

300.5 TEXTILE TESTING MACHINES

References.—Textile Testing machines. *See* 770.

300.6 DEFINITIONS OF TEXTILE TERMS

American Society for Testing Matetrials. D 123–30; 1930. Definitions of Terms Relating to Textile Materials. Includes definitions of imperfections, several mechanical cotton fabrics, twill, drills, alberts, jeans, serge, and clay fabrics, standard condition, regain, moisture content, yarn, cord, thread, lea, count, twist, crimp, etc.

American Society for Testing Materials. Tentative Definitions. D 123–30T; 1930. Definitions of Terms Relating To Textile Materials. Includes definitions of breaker tire fabric, sheeting, osnaburg, airplane fabric, awning cloth, tent duck, elastic webbing, dungaree, burlap, felt, imperfections, hawser twist, cable twist, and hard twist yarns, twine, rope, laid fabric, holland, book fold, shoe fold.

Cotton Textile Institute (Inc.) and National Tent and Awning Mfrs. Assn. Nomenclature and Definitions of Fabrics in the Tent and Tarpaulin Trade. Definitions adopted by the above in 1932 and tentatively adopted by the industry are published by the National Bureau of Standards in CS28–32. Definitions of single filling and double filling duck; army, enameling, flat, numbered, and wagon cover ducks; drill, jean, sheeting, osnaburg; conversion of numbered duck to ounce duck.

300.7 STITCHES AND SEAMS

U. S. Gov., Federal Specifications Board. DDD–S–751; 1930. Stitches, Seams, and Stitching. Standard stitches, seams, and stitching are defined, illustrated, and classified, and given a symbol for each class and type for convenience in reference.

301. PARTIALLY MANUFACTURED COTTON

301.1 WASTE AND PACKING

301.11 Waste

U. S. Gov., Federal Specifications Board. 262a; 1925. Cotton Waste, White. Requirements on type and general quality of new yarn, minimum length of yarn, permissible weight, moisture, and tare content of bale, method of test, packing.

U. S. Gov., Federal Specifications Board. 263a; 1925. Cotton Waste, Colored. Requirements on general quality and type of yarn, percentages of white and colored yarns and slasher yarns, yarn lengths, freedom from foreign material, permissible weight, moisture, and tare content of bales, packing, methods of test.

References.—Waste for journal boxes. *See also* 301.12. Wool waste. *See* 363.1.

301.12 Journal Box Packing

American Railway Assn., Mechanical Div. Method of Analysis of Reclaimed Waste; 1930. Method of washing and determination of dirt and foreign matter.

American Railway Assn. Mechanical Div. New Waste for Journal Box Packing; 1930. Either cotton or wool waste or a combination of the two, requirements on amount of resilient material, percentage of spooler and slasher cotton, length of cotton threads for cotton waste,' and source of material for wool waste, permissible dirt, grease, and moisture.

301.2 CAULKING COTTON

301.3 LINTERS

National Cottonseed Products Assn. Rules; 1930. Rules 130 to 136. Cotton Seed Linters. Specific grades to be those of U. S. Dept. of Agriculture, including the definition of cottonseed hull fiber, dimensions and weight of standard bale of American cotton linters.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 92 and 94; 1925. Official Standards of the U. S. for American Cotton Linters. The standards in each of above publications cover definitions of 7 grades by samples in custody of Dept. of Agriculture, definitions of hull fiber, mixed packed, and off grade grades.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 109; 1928. Items relating to the administration of the U. S. cotton futures and cotton standards acts. Includes standards for color for American cotton linters. Definitions of 7 color grades as embraced in the colors of the samples composing official standards of U. S. for cotton linters.

References.—U. S. grades for other cotton. *See* 300.1.

301.4 MATTRESS FILLING

301.5 ABSORBENT WASTE

References.—Absorbent cotton, surgical. *See* 398.1.

301.6 SMOKELESS POWDER COTTON

References.—Guncotton. *See* 862.

301.7 TARES

302. COTTON YARN, THREAD, AND CORDAGE

302.1 COTTON YARN

302.10 General Items

American Society for Testing Materials. D 180–27; 1927. Tolerances and Test Methods for Cotton Yarns, Single and Plied. Tolerances on strength and size, definition of direction of twist, tolerance on twists per inch, test procedure for strength, correction for regain, determination of size and of ply twist.

American Society for Testing Materials. D 203–25; 1925. Tolerances and Test Methods for Electrical Cotton Yarns. Tolerances on strength, size, and twists per inch, definition of direction of twist, procedure for strength tests, correction for regain, determination of size and of twist of plied yarns.

Associated Knit Underwear Mfrs. of America. Cone colors for cotton yarns, same as given in commercial standard CS33–32 published by Bureau of Standards of U. S. Gov.

National Assn. of Hosiery and Underwear Manufacturers. U. S. Department of Commerce. Commercial Standard CS11–29; 1929. Regain of Mercerized Cotton Yarns. Definitions of moisture content and of regain, standard established for regain.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS11–29; 1929. Regain of Mercerized Cotton Yarns. A commercial standard selected and accepted by industry defining the standard moisture content and regain to be used in price adjustment of buying and selling cotton yarns and for other purposes.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS33-32; 1931. Knit Underwear (Exclusive of Rayon). A commercial standard selected and accepted by industry. Includes recommended practice on cone colors for single cotton yarns, the color of cone on which the yarn is wound designates the size of the yarn, 12 colors recommended.

302.11 Sea Island Cotton Yarn

302.12 Three-ply Bleached Cotton Yarn

302.13 Asbestos Yarn

References.—Asbestos yarn. *See* 545.4.

302.2 COTTON THREAD

302.20 General Items

American Society for Testing Materials. D 204–27; 1927. Tolerances and Test Methods for Cotton Sewing Threads. Tolerances on strength and yards per pound, definition of direction of twist, test procedure for balance, running qualities, strength, yards per pound, length of package, and twist in ply.

302.21 Thread for Flag Making

302.22 Sewing Machine Thread

302.23 Silkateen or Mercerized Cotton Thread

302.24 Colored Thread, Polished

302.25 Thread for Canvas Work

302.3 COTTON TWINE

302.31 Cable Laid Twine

302.32 Cotton Seine Twine

U. S. Gov., Federal Specifications Board. T–T–881; 1930. Cotton Seine Twine. Requirements on general quality, freedom from sizing, loading, linters, etc., size of yarn, construction, yardage per pound, plies per yarn, and breaking strength for 6 sizes, methods of test.

References.—Tolerances and methods of test for cotton yarn. *See also* 302.10. Methods of testing textile materials. *See* 300.4.

302.33 Broom Twine

302.34 White and Khaki Colored Twine

References.—Other white twines *See* 302.31–302.39.

302.35 Sailmakers' Twine

302.36 Wrapping Twine

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment. 1928. Twine for Tying Paper Wrapped Smoked Meats. Of No. 24 cotton, braid, stranding, size of yarn, weight and tensile strength requirements.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R124-31; 1931. Polished Cotton Twine. Simplified practice recommended and accepted by industry establishing a limited number of standard sizes, constructions, weights, and puts-ups, and colors, for plain and surface colored polished twine furnished in balls, on tubes, reels, or in skeins.

U. S. Gov., Federal Specifications Board. T–T–871; 1930. Cotton Wrapping Twine. Requirements on freedom from sizing, loading, etc., on construction, ply, weight, and breaking strength for 10 sizes, methods of test in accordance with F. S. B. spec. 345.

References.—Tolerances and methods of testing cotton yarn. *See also* 302.10. Methods of testing textile products. *See* 300.4. Jute wrapping twine. *See* 326.

302.39 Miscellaneous Cotton Twine

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Boiled Ham Twine, for tying hams for boiling. Twine for Roping Boned Loins for Boiling. Twine for Stringing Sweet Pickled Hams and Picnics. Cotton twines for the boiling meats and hemp for the pickled meats, requirements on size, number of plies, weight, and tensile strength.

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Twine for Tying Casings, Twine for Roping and Hanging Bologna, Twine for Roping Dry Sausage. Requirements on size of cotton twine, number of plies, size of yarn, weight, and tensile strength.

References.—Tolerances and methods of testing cotton yarn. *See also* 302.10.

302.4 COTTON ROPES AND CORDS

302.40 General Items

American Society for Testing Materials. D 179–30; 1930. Tolerances and Test Methods for Tire Cord, Woven and on Cones. Standard tolerances on width, weight, count, thickness, tensile strength, elongation and twist, test procedure for measurement of above items.

U. S. Gov., Dept. of Commerce. Bureau of Standards. T300; 1925. Development of a Standard Bending Test for Rope Yarns. Describes testing machine and gives recommended procedure for making bending test in which the original twist in the yarn is retained during test.

302.41 Bell and Signal Cord

302.42 Chalk Line

302.43 Gill Line

302.44 Halyards

302.45 Lacing Cord

302.46 Sash Cord

U. S. Gov., Federal Specifications Board. 528; 1927. Cotton Braided Sash Cord. Requirements on general quality, finish, ply, and size of yarn, construction of cord, diameter, weight, stretch, breaking strength, number of strands, number of ends per strand, for 5 sizes, absorption test, methods of testing, size of pulley applicable to each size.

References.—Tolerances and methods of testing yarns. *See also* 302.40, 302.10.

302.47 Wrapping Cords

References.—Wrapping twine. *See* 302.36.

302.48 Yoke Ropes

302.49 Miscellaneous Cotton Cords and Ropes

U. S. Gov., Federal Specifications Board. 447; 1926. Cotton Rope. For ¼, ⅜, and ½-inch sizes, requirements on weight and breaking strength, methods of test.

References.—Tolerances and methods of testing yarns and cord. *See also* 302.40, 302.10, 303.8. Tire cord. *See* 303.8.

303. COTTON MECHANICAL FABRICS

303.0 GENERAL ITEMS

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Cotton Duck. List of recommended standard widths and weights.

American Society for Testing Materials. D 122–30; 1930. Tolerances and Test Methods for Tire Fabrics Other Than Cord Fabrics. Tolerances on width, weight, count, thickness, strength, twist, crimp, and bow; test procedure for measurement of above items.

American Society for Testing Materials. D 181–25; 1925. Tolerances for Hose Ducks and Belt Ducks. Tolerances on width and weight of hose duck, rubber and balata belt ducks, and stitched canvas belting duck, tolerances on thread count and gage of hose and belting ducks, tolerances on crimp and tensile strength.

American Society for Testing Materials. D 230–27; 1927. Tolerances for Numbered Cotton Duck. Tolerances on width, weight, threads per inch, and strength.

U. S. Gov., Dept. of Commerce. Bureau of Standards R27; 1927. Cotton Duck. Simplified practice recommended and accepted by industry establishing a limited list of standard widths and weights of sail duck and of wide duck (26 and 120 inches).

303.1 COTTON DUCK

American Marine Standards Committee. E No. 19–1928. Cotton Duck for Insulation Coverings. Requirements as to length, weave, thread count and ply, width, weight, strength, and methods of testing and sampling.

U. S. Gov., Federal Specifications Board. 53; 1924. Numbered Cotton Duck. Requirements on general quality, weave, widths, weight, number of ply, thread count, and breaking strength test for hard texture and medium texture grades.

U. S. Gov., Federal Specifications Board 159; 1924. Light Weight Duck (Army Duck, Grey). Requirements on weave, weight, width, ply, thread count, and breaking strength, methods of test.

References.—Tolerances, methods of testing, definitions, standard sizes and weights. *See also* 303.0, 300.4, 300.6. Other cotton duck. *See* 303.2, to 303.9.

303.2 CLOTHING DUCK

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Includes white union duck for hot weather uniform, requirements on weave with linen filling, thread count, strength, and weight.

References.—*See* references under 303.1. Cotton uniforms. *See* 311.6.

303.3 DUCK FOR BAGS

American Society for Testing Materials. D 205–27; 1927. Osnaburg Cement Sacks. Requirements, tolerances, and method of test for width, weight, thread count, tensile strength of material, cut and seam construction of sacks.

References.—Tolerances, methods of testing, definitions, standard sizes and weights. *See also* 303.0, 300.4, 300.6. Stitches and stitching. *See also* 300.7.

303.4 LINING DUCK

303.5 TENT DUCK

U. S. Gov., Federal Specifications Board 160; 1924. Tent Duck. Of grade suitable for bleaching or dyeing or for use in grey state, requirements on weave, weight, width, ply, thread count, and breaking strength for 4 weights, methods of testing.

References.—*See* references under 303.3. Other cotton duck. *See* 303.1.

303.6 AWNING CLOTH

U. S. Gov., Federal Specifications Board. CCC–C–406; 1931. Awning Cloth. Covers 3 types of woven stripe cloth, 1 type of painted stripe or tinted solid colors, and 1 type of piece dyed. Requirements on weave, weight, width, thread count, construction, and breaking strength.

References.—*See* references under 303.3.

303.7 DUCK FOR MATTRESS COVERS AND COTS

References.—Duck for canvas cots. *See* 319.94.

303.8 TIRE CORD AND FABRICS

American Society for Testing Materials. D 179–30; 1930. Tolerances and Test Methods for Tire Cord, Woven and on Cones. Standard tolerances on width, weight, count, thickness, tensile strength, elongation and twist, test procedure for measurement of above items.

American Society for Testing Materials. D 298–29; 1929. 23/5/3 Carded American Tire Cord. For cord of 23/5/3 construction, requirements on grade of cotton, staple length, tensile strength of cord, elongation, size or yardage, thickness, number and direction of twists, and permissible variations, test methods according to A. S. T. M. method D 179.

American Society for Testing Materials. Tentative Specifications. D 316–31T; 1931. Chafer Tire Fabrics. For 8, 9, 12, and 14 oz. grades, requirements on construction, width, weight, count, thickness, tensile strength, ply twist, crimp, methods of testing.

American Society for Testing Materials. Tentative Specifications. D 336-31T; 1931. Enameling Duck for the Tire Industry. Requirements on weight, thread count, thickness, yarn size and ply, and tensile strength for single filling and for double filling duck, methods of test.

References.—Tolerances, methods of testing, definitions, standard sizes and weights. *See also* 303.0, 300.4, 300.6. Pneumatic tires. *See* 206.

303.9 MISCELLANEOUS MECHANICAL FABRICS OF COTTON

303.91 Mode Duck

303.92 White Duck

References.—White clothing duck. *See* 303.2.

303.93 Enameled Duck

303.94 Rubberized Duck

303.95 Waterproof Duck

References.—Waterproof fabric. *See* 302.4.

303.96 Packing

References.—Canvas and other fabric packing. *See* 707.25.

303.97 Hose and Belt Ducks

American Society for Testing Materials. D 181–25; 1925. Tolerances for Hose Ducks and Belt Ducks. Tolerances on width, weight, thread count and gage, crimp and tensile strengths.

References.—Tolerances, methods of test, definitions, standard sizes and weights. *See also* 303.0, 300.4, 300.6.

304. COTTON CLOTH, BLEACHED AND UNBLEACHED

304.1 COTTON CLOTH, PLAIN

Textile Converters' Assn. Definition of Fair Trade Practices in the Sale and Purchase of Cotton Gray Goods for the Converting Trade. Published in Converters' Yardstick, the official journal of the T. C. A., for June, 1931. Prepared and adopted jointly with Assn. of Cotton Textile Merchants of New York. Definitions of single cuts and double cuts, requirements on percentage of yardage to be delivered in double cuts for various gray cotton fabrics, use of oil remover, tolerances from specified amounts for yardage, width, warp and filling count, and weight.

References.—Cotton cloth for rubber and pyroxylin coating. *See* 306.24.

304.2 FLANNEL

U. S. Gov., Federal Specifications Board. 613; 1929. Canton Flannel. Requirements on general quality of cotton, finish, weave, width, length of bolt or roll, weight, thread count, and breaking strength, testing according to methods of F. S. B. spec. 345 for textile materials.

References.—Cotton grades. *See* 300.0, 300.1. Tolerances, methods of testing, definitions. *See also* 300.4, 300.6.

304.3 CHEESECLOTH

Institute of American Meat Packers. Packinghouse Supplies, Packs and Equipment; 1928. Cheese Cloth and Muslin. For wiping smoked meats and desks, for lining meat boxes and tubs, for sacking meat cuts and smoked meats, requirements for thread count and weight for six grades.

U. S. Gov., Federal Specifications Board. 251a; 1925. Cheesecloth for Wiping Purposes. For bleached or unbleached cotton cheesecloth which may be seconds, requirements on cleanness, width, and weight.

U. S. Gov., Federal Specifications Board. 252b; 1926. Unbleached Cheescloth. For first quality, clean, cotton cheesecloth, requirements on length, width, thread count, weight for 2 grades, tolerances, methods of test as specified in F. S. B. spec. 345 for textile materials.

U. S. Gov., Federal Specifications Board. 253b; 1928. Bleached Cheesecloth. For high thread count or low thread count types, requirements on thread count, weight, length, width, methods of test as specified in F. S. B. spec. 345 for textile materials.

U. S. Gov., Federal Specifications Board. 344; 1925. Chesecloth Remnants for Wiping Purposes. For bleached or unbleached cheesecloth, requirements on weight, minimum width and length.

References.—Tolerances, methods of testing definitions. *See* 300.4, 300.6.

304.4 DRILL

Abrasive Paper and Cloth Manufacturers Exchange. Abrasive Coated Products; 1929. Includes drill cloth for backing for abrasive, requirements on weight, tensile strength and method of test.

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Includes white cotton drill for hot weather uniforms, requirements on weave, thread count, tensile strength, and weight of material.

American Society for Testing Materials. Tentative Specifications. D 334-31T; 1931. Cotton Goods for Rubber and Pyroxylin Coating. Permissible amount and types of defects in the cotton goods, requirements on selvage, permissible content of sizing and natural oils for sheetings, drills, sateens, and broken twills, permissible amount of injurious chemicals, tolerances on width, thread count, and weight, required tensile strength, test methods.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS32–31; 1931. Cotton Goods for Rubber and Pyroxylin Coating. A commercial standard selected and accepted by industry covering requirements on tensile strengths for various constructions of sheeting, drill, twill, broken twill, and sateen, length of cuts, permissible and nonpermissible defects, permissible sizing and injurious chemicals, methods of test.

U. S. Gov., Federal Specifications Board. 557; 1928. Drill (Unbleached). For 4 types of first quality, requirements on finish, weave, width, length, weight, thread count, breaking strength, methods of test according to F. S. B. spec. 345 for textile materials.

References.—Tolerances, methods of testing, definitions. *See* 300.4, 300.6. Gray goods for converting trade. *See* 304.1.

304.5 JEAN

Abrasive Paper and Cloth Manufacturers Exchange. Abrasive Coated Products; 1929. Include jean cloth for backing, requirements on weight and tensile strength and method of test.

U. S. Gov., Federal Specifications Board. 614; 1929. Bleached Jeans. Requirements on general quality of cotton, weave, width, length of roll, weight, thread count, breaking strength, testing according to methods of F. S. B. spec. 345 on textile materials.

References.—Tolerances, methods of testing, definitions. *See also* 300.4, 300.6. Gray goods for converting trade. *See* 304.1.

304.6 MUSLINS

Institute of American Meat Packers. Packinghouse Supplies. Packs and Equipment. 1928. Cheese Cloth and Muslin. For wiping smoked meats and desks, for lining meat boxes and tubs, for sacking meat cuts and smoked meats, requirements for thread count and weight for six grades.

References.—Gray goods for converting trade. *See* 304.1.

304.7 SHEETINGS

304.71 Sheetings, Bleached and Unbleached

American Society for Testing Materials. Tentative Specifications. D 334-31T; 1931. Cotton

Goods for Rubber and Pyroxylin Coating. Permissible amount and types of defects in the cotton goods, requirements on selvage, permissible content of sizing and natural oils for sheetings, drills, sateens, and broken twills, permissible amount of injurious chemicals, tolerances on width, thread count, and weight, required tensile strength, test methods.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS32–31; 1931. Cotton Goods for Rubber and Pyroxylin Coating. A commercial standard selected and accepted by industry covering requirements on tensile strengths for various constructions of sheeting, drill, twill, broken twill, and sateen, length of cuts, permissible and nonpermissible defects, permissible sizing and injurious chemicals, methods of test.

U. S. Gov., Federal Specifications Board. CCC–S–271; 1931. Cotton Sheeting, Bleached, Wide. For plain weave commercial "firsts," requirements on length of cut or rolls, thread count, weight, breaking strength, and standard widths, methods of test as specified in F. S. B. No. 345 for textile materials.

U. S. Gov., Federal Specifications Board. CCC-S–281; 1931. Cotton Sheeting, Unbleached, Narrow. For plain weave sheeting, requirements on length of roll, width of cloth, weight, thread count, and breaking strength for 6 types of construction, methods of test in accordance with F. S. B. spec. 345 for textile materials.

U. S. Gov., Federal Specifications Board. CCC–S–291; 1931. Cotton Sheeting, Unbleached, Wide. For commercial "firsts," requirements on weave, length of bolt or roll, thread count, widths, weight, breaking strength, testing in conformity with F. S. B. spec. 345 for textile materials.

References.—Tolerances, methods of testing, definitions. *See also* 300.4, 300.6. Sheets, brown sheeting. *See* 315.2, 304.76. Rubber sheeting. *See* 204.33. Gray goods for converting trade. *See* 304.1.

304.72 Cotton Hull Sheeting

304.73 Pontoon Sheeting

304.74 Cotton Sheeting for Mounting

304.75 Gray Cotton Sheeting

304.76 Brown Sheeting

U. S. Gov., Federal Specifications Board. 302; 1925. Brown Wide Cotton Sheeting. Requirements on finish, weave, thread count, length of cut or roll, weight, and breaking strength for 9 widths of 42 to 99 inches, methods of sampling and test.

References.—Tolerances, methods of testing, definitions. *See also* 300.4, 300.6. Unbleached cotton sheeting. *See* 304.71.

304.8 TICKING

U. S. Gov., Federal Specifications Board. CCC–T–351; 1931. Mattress and Pillow Ticking. One type for mattresses and one type for pillows, requirements on general quality of cotton, width of white and blue stripes, weave, length of bolt or roll, fastness of dye, width, weight, thread count and breaking strength, testing according to methods of F. S. B. spec. 345 for textile materials.

References.—Tolerances, methods of testing, definitions. *See also* 300.4, 300.6.

304.9 COTTON TOWELING

304.91 Cotton Crash Toweling

U. S. Gov., Federal Specifications Board. 633; 1929. Crash Towels, Mixed Linen and Cotton. For crash toweling and for crash towels, of cotton warp and linen filling, requirements on finish, weave, width, weight, thread count, breaking strength, length, testing in conformity with methods of F. S. B. spec. 345 on textile materials.

References.—Towels. *See also* 319.3. Tolerances, methods of testing, definitions. *See also* 300.4, 300.6.

304.92 Cotton Huck Toweling

U. S. Gov., Federal Specifications Board. DDD-T–531; 1931. Office Huck Towels with Woven Name. For grade known as "firsts," requirements on weave, width and length, weight, threads per inch, permissible sizing, permissible seconds in grade, F. S. B. spec. 345 for textile materials to be complied with also.

References.—*See* references under 304.91.

304.93 Turkish Toweling

References.—*See* references under 304.91.

304.94 Dish Toweling

U. S. Gov., Federal Specifications Board. 616; 1929. Cotton Glass Towels. For glass toweling and glass towels, requirements on general quality of cotton, finish, weave, width, weight, thread count, breaking strength, length, testing according to methods of F. S. B. spec. 345 for textile materials.

References.—*See* references under 304.91.

306. COTTON CLOTH, PRINTED, DYED, COLORED, OR WOVEN FIGURED

306.0 GENERAL ITEMS

Textile Color Card Assn. of the U. S. (Inc.). Standard Color Card. 8th ed.; 1928. Card containing 192 textile color samples, standardized and issued by this assn., each color having a name and number. The association also issues spring and fall seasonal color cards showing standardized colors forecast for the season.

306.1 DRESS MATERIAL

306.11 Calico

306.12 Chambry

306.13 Checks

306.14 Lawn

306.15 Nainsook

306.16 Seersucker

306.17 Swiss

306.18 Gingham

306.19 Miscellaneous Cotton Dress Materials

U. S. Gov., Federal Specifications Board. 556; 1928. Percale. Of commercial first quality, requirements on finish, permissible sizing, weave, width, length, weight, thread count, breaking strength, fastness of dye, methods of test in accordance with F. S. B. spec. 345 for textile materials.

References.—Tolerances, methods of testing, definitions. *See also* 300.4, 300.6. Standard colors. *See* 306.0.

306.2 LINING MATERIALS

306.21 Canvas, Crinoline, and Buckram

References.—Cotton duck. *See* 303.1, 303.2.

306.22 Cambric

References.—Varnished cambric. *See* 719.56.

306.23 Padding

306.24 Sateen and Silesia

American Society for Testing Materials. Tentative Specifications. D 334-31T; 1931. Cotton Goods for Rubber and Pyroxylin Coating. Permissible amount and types of defects in the cotton goods, requirements on selvage, permissible content of sizing and natural oils for sheetings, drills, sateens, and broken twills, permissible amount of injurious chemicals, tolerances on width, thread count, and weight, required tensile strength, test methods.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS32–31; 1931. Cotton Goods for Rubber and Pyroxylin Coating. A commercial standard selected and accepted by industry covering requirements on tensile strengths for various constructions of sheeting, drill, twill, broken twill, and sateen, length of cuts, permissible and nonpermissible defects, permissible sizing and injurious chemicals, methods of test.

References.—Tolerances, methods of testing, definitions. *See also* 300.4, 300.6.

306.25 Lustrine

306.26 Galatea

306.27 Wigan

306.28 Venetian

306.3 SUITINGS, COTTON

306.31 Denim and Cottonade

U. S. Gov., Federal Specifications Board. CCC–D–161; 1931. Brown Denim, Shrunk. For type commercially known as 2.20 brown denim with white back, requirements on color, shrinkage test, weave, width, length of piece, color fastness, thread count, weight, breaking strength, methods of test specified in F. S. B. No. 345 for textile materials.

U. S. Gov., Federal Specifications Board. CCC–D–171; 1931. Brown Denim, Unshrunk. For type known commercially as 2.20 brown denim, white back, requirements on color, shrinkage test, weave, width, length of piece, color fastness, thread count, weight, and breaking strength, methods of test specified in F. S. B. spec. No. 345.

U. S. Gov., Federal Specifications Board. CCC–D-151; 1931. Blue Denim. Covers shrunk denim. For whiteback, mock twist, pin stripe, hickory stripe, express stripe, and white stripe classes and 2.40, 2.20, 2.00, and 1.80 commercial types, requirements on colors of warp and filling threads for various classes, permissible shrinkage, weave, length, width, color fastness, thread count, weight, and breaking strength, methods of test as specified in F. S. B. spec. 345 for textile materials.

U. S. Gov., Federal Specifications Board. CCC–D–156; 1931. Indigo Blue Denim, Unshrunk. For whiteback, mock twist, pin stripe, hickory stripe, express stripe, and white stripe types, requirements on weave, length of cuts or rolls, width, weight, breaking strength and tolerances, for 4 weight grades, shrinkage test, methods of test specified in F. S. B. No. 345 for textile materials.

References.—Tolerances, methods of testing, definitions. *See also* 300.4, 300.6.

306.32 Uniform Cloth, Cotton

References.—Clothing duck. *See* 303.2. Khaki uniform cloth. *See* 306.34. Cotton twill uniform cloth. *See* 306.36.

306.33 Italian Cloth

306.34 Khaki Cloth, Cotton

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Includes cotton khaki cloth for hot weather uniform, requirements on weave, finish, color, weight, and tensile strength.

References.—Tolerances, methods of testing, definitions. *See also* 300.4, 300.6. Standard colors. *See* 306.0.

306.35 Print Cloth

References.—Gray goods for converting trade. *See* 304.1.

306.36 Cotton Twill

Abrasive Paper and Cloth Manufacturers Exchange. Abrasive Coated Products; 1929. Includes twill cloth for backing for abrasive, requirements on weight and tensile strength and method of test.

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Includes white cotton cloth of twill weave for hot weather uniforms, requirements on weave, thread count, tensile strength, and weight of material.

American Society for Testing Materials. Tentative Specifications. D334–31 T; 1931. Cotton Goods for Rubber and Pyroxylin Coating. Permissible amount and types of defects in the cotton goods, requirements on selvage, permissible content of sizing and natural oils for sheetings, drills, sateens, and broken twills, permissible amount of injurious chemicals, tolerances on width, thread count, and weight, required tensile strength, test methods.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS32–31; 1931. Cotton Goods for Rubber and Pyroxylin Coating. A commercial standard selected and accepted by industry covering requirements on tensile strengths for various constructions of sheeting, drill, twill, broken twill, and sateen, length of cuts, permissible and nonpermissible defects, permissible sizing and injurious chemicals, methods of test.

References.—Tolerances, methods of testing, definitions. *See* 300.4, 300.6. Gray goods for converting trade. *See* 304.1.

306.4 BUNTING

306.41 Cotton Bunting

U. S. Gov., Federal Specifications Board. 611; 1929. Cotton Bunting. Requirements on general quality of cotton, weave, width, length of bolt or roll, weight, threads per inch, ply, breaking strength, fastness of dye, color according to standard sample, tests according to methods of F. S. B. spec. 345 for textile materials.

References.—Tolerances, methods of testing, definitions. *See* 300.4, 300.6. Standard colors. *See* 306.0.

306.42 Wool Bunting

U. S. Gov., Federal Specifications Board. CCC–B–801; 1931. Wool Bunting. Requirements on weave, width and length of bolt or roll, weight, thread count, ply of warp and filling, breaking strength, evenness and fastness of color, with methods of test according to F. S. B. spec. 345 for textile materials.

References.—Tolerances, methods of testing, definitions. *See* 360, 300.4, 300.6. Standard colors. *See* 306.0.

306.43 Cotton Flags

American Railway Assn. Operating Div. Circular 2087; 1920. Bunting Signaling Flags. Dimensions of the one standard size adopted.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stock; 1930. Report of committee recommending one standard size of signal flag to be carried in stock.

306.44 Wool Flags

306.45 Silk Flags

306.46 Flag Kits

307. YARN-DYED OR STOCK-DYED COTTON CLOTH

References.—See items under 306.1, 306.2, and 306.3, except calico 306.11 and print cloth 306.35.

308. MISCELLANEOUS COTTON CLOTH

308.1 DAMASK

308.2 PILE FABRICS, PLUSHES, VELVETEENS, AND CORDUROYS

308.3 LINSEY-WOOLSEY

308.4 DAIRY CLOTH

308.5 DIAPER CLOTH

U. S. Gov., Federal Specifications Board. 612; 1929. Birdseye (Diaper) Cloth. For cloth by yard and for diapers, requirements on general quality of cotton, finish, weave, width, weight, thread count, and length, testing according to methods of F. S. B. spec. 345 for textile materials.

References.—Tolerances, methods of testing, definitions. *See* 300.4, 300.6.

308.6 CONVALESCENT CLOTH

308.7 MOMIE CLOTH

308.8 PROCESS CLOTH

308.9 MISCELLANEOUS SPECIFICATIONS FOR COTTON FABRICS

References.—Waterproof cotton fabric. *See* 392.4. Cotton airplane cloth. *See* 396. Surgical gauze. *See* 398.2. Elastic webbing. *See* 394.5.

309. COTTON KNIT GOODS

309.0 GENERAL ITEMS

American Society for Testing Materials. Tentative Specifications. D 231–28T; 1928. Tolerances and Test Methods for Knit Goods. Tolerances for width, weight, and count, apparatus and method of test for moisture regain, determination of grease, width, weight, wales and courses, bursting strength, percentage of cotton and wool according to A. S. T. M. method D 276, thickness according to D 39.

Associated Knit Underwear Mfrs. of America. Proposed Standard Method of Testing Knitted Fabrics; 1924. Requirements on atmospheric conditions, dimensions, and direction of cut of test specimens, type of machine and test procedure for tensile tests, size and shape of clamping jaws.

309.1 GLOVES

References.—Rubber gloves. *See* 203.2, 204.52.

309.2 HOSIERY

National Assn. of Hosiery and Underwear Manufacturers. U. S. Dept. of Commerce. Bureau of Standards paper T324; 1926. Standard Hosiery Lengths. Standard lengths for ladies', men's, children's and misses' ribbed, children's sport, infants' ribbed hose and infants' and children's socks, standard method of measurement.

Textile Color Card Assn. of the U. S. (Inc.) and National Assn. of Hosiery and Underwear Mfrs. Standard Hosiery Color Card of America; 1927. Card containing 88 hosiery color samples, standardized and issued by T. C. C. A., each color having a name and number. Assn. also issues seasonal color cards showing standard colors forecast for the season.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C149; 1924. A Standardized Method of Measuring the Size of Hosiery. Adopted by manufacturers and the Federal Spec. Board., Nat'l Assn. of Hosiery and Underwear Mfrs., and Am. Home Economics Assn. Defines and illustrates the standard method of measuring the size of circular knit hose and defines sizes.

U. S. Gov., Federal Specifications Board. 92; 1923. Measuring Sizes of Hosiery. Standard method of measurement of length of foot of hosiery.

References.—Tolerances, methods of testing, definitions. *See* 309.0, 300.4, 300.6. Hosiery boxes. *See* 953.2.

309.3 JERSEY COTTON CLOTH

309.4 KNIT UNDERWEAR

Associated Knit Underwear Mfrs. of America. For cotton underwear the standards given in commercial standard CS33–32, published by Bureau of Standards, have been adopted.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS33–32; 1931. Knit Underwear (Exclusive of Rayon). A commercial standard selected and accepted by industry establishing standard measurements and standard methods of measuring knit underwear, flat knit and ribbed types. Includes cotton union suits for men, boys, children, and women, flat fleece union suits for men and boys, athletic union suits for men and boys, cotton shirts for men and boys, polo shirts for men, athletic shirts for men and boys, infants shirts, cotton drawers for men, boys, and women, athletic shorts for men, cotton vests for children and women, cotton pants for children, sleeping garments for children, infants bands, recommended practice on standard symbols for different models.

References.—Tolerances, methods of testing, definitions. *See* 309.0, 300.4, 300.6. Underwear box sizes. *See* 953.2. Wool knit underwear. *See* 367.2. Rayon knit underwear. *See* 397.12.

310–319 MANUFACTURES OF COTTON FABRIC

311. COTTON OUTERWEAR

311.1 COATS AND JACKETS, COTTON

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes white coats for butchers, cooks, and waiters, standard commercial sizes, no dimensions given.

311.2 DRESSES AND WAISTS, COTTON

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS13–30; 1930. Dress Patterns. A commercial standard selected and accepted by industry covering standard measurements of bust, hip, waist, etc., for various standard pattern sizes for ladies, misses, children, etc., standard widths of material recognized for pattern layouts and estimation of yardage required.

References.—Boys' waists. *See* 311.5.

311.3 WORK CLOTHING

311.4 PANTS, TROUSERS, AND BREECHES, OF COTTON

References.—Pants for uniforms. *See* 311.6.

311.5 COTTON SHIRTS

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS14–31; 1931. Boys' Blouses, Button-On Waists, Shirts, and Junior Shirts. Commercial standard selected and accepted by industry covering standard minimum measurements at key points for various sizes of above apparel and methods of measuring.

311.6 SUITS AND UNIFORMS, COTTON

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Hot weather uniform. For white cotton drill, white union duck, or cotton khaki, requirements on weave, thread count, tensile strength, and weight of material, cut and construction of trousers and single breasted unlined sack coat, number, size, and type of buttons, pockets, etc.

References.—Methods of testing fabrics. *See* 300.4. Materials for uniforms. *See also* 303.2, 304.4, 306.34, 306.36. Wool uniforms. *See* 368.82.

311.7 OPERATING GOWNS

References.—Surgeons rubber aprons. *See* 204.51.

311.8 BELTS

National Electric Light Assn. Suggested Specifications. Publ. 24–51; 1924. Linemen's Cotton Web Safety Belts. Requirements on general quality leather in strap of body belt, width, number of plies, and weight of cotton in body belt cushion and in safety belt, material in D rings and snaps, dimensions, design, and construction of body belt and safety belt, tension test requirements.

References.—Methods of testing. *See* 300.4. Leather belts. *See* 069.3.

311.9 MISCELLANEOUS COTTON OUTERWEAR

References.—Hats and caps. *See* 395.

311.92 Aprons and Bibs

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes bib aprons for butchers and cooks, standard dimensions of one size.

References.—Rubber aprons. *See* 204.51.

311.93 Gloves and Mittens, Cotton

References.—Rubber gloves. *See* 203.2, 204.52.

311.94 Leggings

311.95 Mackinaws of Cotton

311.96 Cotton Cloth Shoes

311.97 Parka

311.98 Bathrobes, Cotton

312. COTTON UNDERWEAR

312.1 COTTON DRAWERS

References.—Knit underwear. See 309.4.

312.2 NIGHTGOWNS

312.3 PAJAMAS

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS15–29; 1929. Men's Pajamas. A commercial standard selected and accepted by industry for pajamas made of woven fabrics, covers minimum measurements at certain key points of coats and trousers, method of measuring.

312.4 PETTICOATS

312.5 COTTON UNDERSHIRTS

References.—Knit underwear. *See* 309.4.

313. HANDKERCHIEFS AND LACES

313.1 HANDKERCHIEFS

313.2 LACES

References.—Gold and silver lace. *See* 399.9.

314. COTTON BELTING

314.1 FABRIC BELTING

American Petroleum Institute. Standard No. 1; 1931. Belting Specifications Impregnated Stitched Cotton Fabric Belting. For oil country purposes, not including stitched rubber and balata belting, requirements on construction, impregnation, elongation, tensile strength, tolerances on width, methods of test.

American Petroleum Institute. Standard No. 1; 1931. Belting Specifications. Solid Woven Cotton Belting. For oil country purposes, single, double, and triple thicknesses, requirements on thickness, general quality, impregnation, elongation, tensile strength, tolerance on width, method of test.

American Petroleum Institute. Standard No. 1; 1931. Belting Specifications. Solid Woven Hair Belting. For oil country purposes, requirements on thickness of single, double, and triple thicknesses, general quality, impregnation, elongation, tensile strength, tolerances on width, methods of test.

American Society for Testing Materials. D 181–25; 1925. Tolerances for Hose Ducks and Belt Ducks. Tolerances on width and weight of hose duck, rubber and balata belt ducks, and stitched canvas belting duck, tolerances on thread count and gage of hose and belting ducks, tolerances on crimp and tensile strength.

Society of Automotive Engineers; 1931 Handbook. Recommended Practice. Canvas and Rubber Driving Belts; 1923. Length tolerance, driven pulley diameters for various ply belts, belt-duck weight and stitching requirements, horsepower ratings for various belt widths and number of plies, test requirements on separation of plies in rubber belting.

References.—Tolerances, methods of testing, definitions. *See also* 300.4, 300.6. Fabric conveyor belting. *See* 314.3. Leather belts. *See* 066.3. Rubber belts. *See* 207.

314.3 CONVEYOR BELTING

U. S. Gov., Federal Specifications Board. DDD–B–171; 1931. Conveyor Belting. For stitched duck belting, requirements on weave, weight, thread count, breaking strength, stitching and strength of stitching thread, construction of seam, water absorption test, structural features of 4 ply belt, to be in accord with F. S. B. spec. 345 for textile materials and DDD–S–751 for stitches.

References.—*See* references under 314.1.

315. BEDDING

315.0 GENERAL ITEMS

U. S. Gov., Dept. of Commerce. Bureau of Standards. R 74; 1930. Hospital and Institutional Cotton Textiles. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes for bed pads, pillowcases, sheets, spreads, bureau scarfs, bath and hand towels, for adult beds, cribs, and bassinets.

315.1 MATTRESSES AND MATTRESS COVERS

315.10 General Items

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship

Equipment. Includes standard sizes, types, and grades for mattresses and mattress pads.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R2–30; 1930. Bedsteads, Springs and Mattresses. For mattresses, simplified practice recommended and accepted by industry establishing a limited list of standard sizes to correspond with established list of standard bed and spring sizes.

315.11 Cotton Felt Mattresses

References.—Ticking for mattresses. *See* 304.8. Standard sizes. *See* 315.10.

315.12 Kapok Mattresses

References.—*See* references under 315.11.

315.13 Hair Mattresses

References.—Ticking for mattresses. *See* 304.8. Standard sizes. *See* 315.10. Curled horsehair. *See* 362.1.

315.14 Mattress Cases and Covers

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes mattress covers, standard kinds and sizes.

References.—Standard sizes of mattress pads. *See* 315.10, 315.0.

315.2 SHEETS

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes sheets, standard sizes and kinds.

U. S. Gov., Federal Specifications Board. DDD–S–281; 1931. Sheets, Cotton, Bleached. For 3 types dependent on size, requirements on weave, thread count, weight, breaking strength, dimensions, construction of hems and stitches, testing in conformity with F. S. B. spec. 345 for textile materials.

References.—Standard sizes. *See also* 315.0. Tolerances, methods of testing, definitions. *See* 300.4, 300.6. Sheeting. *See* 304.7. Rubber sheeting. *See* 204.33.

315.3 PILLOWCASES AND PILLOWS

References.—Rubber pillows and cushions. *See* 204.25.

315.30 General Items

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. For pillows, standard sizes and kinds, number of standard grades for each kind.

315.31 Pillowcases and Sacks

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes pillow covers and pillow slips, standard kinds and sizes.

U. S. Gov., Federal Specifications Board. DDD–P–351; 1931. Pillowcases, Cotton, Bleached. For 4 types dependent on size, requirements on dimensions of each type, weave, thread count, weight, breaking strength of material, construction of hems, seams, and stitching, to conform to F. S. B. spec. 345 for textile materials.

References.—Pillow ticking. *See* 304.8. Standard kinds and sizes. *See also* 315.0 Tolerances, methods of testing, definitions. *See* 300.4, 300.6.

315.32 Cotton Felt Pillows

References.—Pillow ticking. *See* 304.8. Standard sizes. *See* 315.30.

315.33 Feather Pillows

315.34 Kapok Pillows

315.35 Hair Pillows and Cushions

315.4 COUNTERPANES, BEDSPREADS

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes bed spreads, standard sizes and kinds.

U. S. Gov., Federal Specifications Board. 620; 1929. Crinkle Bedspreads. For cotton bedspreads of commercial grade "firsts," requirements on general quality, finish, weave, dimensions of 8 sizes, weight, thread count, breaking strength, testing in accordance with methods of F. S. B. spec. 345 for textile materials.

References.—Standard sizes. *See also* 315.0. Tolerances, methods of testing, definitions. *See* 300.4, 300.6.

315.5 BLANKETS

References.—Standard sizes and grades of blankets. *See* 369.21.

315.6 SPRING COVERS

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes canvas spring covers, standard sizes.

316. TABLECLOTHS, NAPKINS, AND SILENCE CLOTHS

316.1 TABLECLOTHS

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes tablecloths, cotton and linen, standard sizes.

U. S. Gov., Federal Specifications Board. 500; 1927. Cotton Tablecloths. For finished tablecloths and tablecloths in bolt form, requirements on general quality of cotton, weave, width, weight, thread count, strength, finish, length, methods of test in accordance with F. S. B. spec. 345 for textile materials.

References.—Tolerances, methods of testing, definitions. *See* 300.4, 300.6.

316.2 NAPKINS

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes napkins, linen and cotton, standard sizes.

316.3 SILENCE CLOTHS

316.4 TRAY CLOTHS

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes linen tray cloths, standard sizes.

317. NETS AND NETTING

317.1 BOBBINET

U. S. Gov., Federal Specifications Board. 540a; 1929. Mosquito Netting (Unbleached Bobbinet). Requirements on weave, width, lengths of pieces, weight, meshes per inch, breaking strength, using methods of test of F. S. B. spec. 345 for textile materials.

References.—Tolerances, methods of testing, definitions. *See* 300.4, 300.6.

317.2 MILLINET

317.3 MOSQUITO BAR NETTING

References.—Mosquito bar. *See* 317.1.

317.4 FISH NET

317.5 HAY NET

317.6 HEAD NET

317.7 VOLLEY BALL AND TENNIS NETS

American Physical Education Assn., National Section on Women's Athletics. Volley Ball Rules for Girls and Women; 1930. (Publ. No. 115R of American Sports Publ. Co., 45 Rose St., N. Y.). Net. Requirements on width, length, size of mesh, color and size of thread, binding with manila rope and canvas, wire cable support.

International Lawn Tennis Federation. U. S. Lawn Tennis Assn. Rules of Lawn Tennis; 1930. (Publ. No. 57X of Am. Sports Publ. Co., 45 Rose St., N. Y.). Net. Requirements on height of net, permissible size of supporting cord or cable, width of band covering cable, size of holding down strap.

319. MISCELLANEOUS MANUFACTURES OF COTTON

319.1 COTTON BATTING AND WADDING

319.2 FLAGS AND FLAG KITS

References.—Railway signal flags. *See* 306.43.

319.3 TOWELS AND BATH MATS

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes bath mats, standard sizes.

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes towels, cotton and linen, standard sizes and kinds.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R74; 1927. Hospital and Institutional Cotton Textiles. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes for bedding and for bath and hand towels.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R119–31; 1931. Fast Selvage Terry Towels (Turkish Towels). Simplified practice recommended and accepted by industry establishing a list of 6 standard stock sizes from 16 by 30 inches to 24 by 48 inches.

References.—Towels and toweling. *See also* 304.91, 304.92, 304.94. Paper towels. *See* 471.3.

319.4 MOPS (WIPERS AND POLISHING CLOTHS)

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes scrub cloths, heavy, coarsely woven, standard dimensions for one size.

U. S. Gov., Federal Specifications Board. 259a; 1927. Colored Cotton Rags for Wiping Machinery. Requirements on color, softness, freedom from foreign materials, size limits, weight, permissible moisture and tare in bales, washing and sterilization, methods of test including reference to F. S. B. spec. 345 for textile materials.

U. S. Gov., Federal Specifications Board. 260; 1925. Wiping Cloths. Requirements on general quality, softness, freedom from dirt, size, weight, permissible moisture and tare content of bale, methods of test.

U. S. Gov., Federal Specifications Board. 261a; 1927. White Cotton Rags for Wiping Machinery. Requirements on softness, freedom from foreign material, size, weight, permissible weight, moisture content, and tare content in bale, washing and sterilization, methods of test, to conform to F. S. B. spec. 345 for textile materials.

References.—Methods of testing, definitions. *See also* 300.4, 300.6. Cheesecloth for wiping purposes. *See* 304.3. Mop sticks. *See* 983.1.

319.5 BAGS

References.—Cloth bags. *See* 957.1. Duck for bags, burlap. *See* 303.3, 322.1, 322.2.

319.6 CARPET LINING

References.—Felt. *See* 365.98, 473.2.

319.7 PADS

References.—Surgical operating pads of rubber. *See* 204.53.

319.9 MISCELLANEOUS MANUFACTURED COTTON PRODUCTS

319.91 Awnings and Curtains

References.—Window shades. *See* 392.23.

319.92 Bindings, Braid

319.93 Cotton Sleeving

319.94 Canvas Cots, Hammocks

U. S. Gov., Federal Specifications Board. 240; 1924. Folding Canvas Cot. Requirements on over all dimensions when opened, permissible hardwoods and required dimensions of wooden frame, side rails, sticks, requirements on construction, gauge of sheet steel parts, size of rivets, weight, dimensions, and strength of duck cover, for unbleached cover and for khaki cover, size of thread, folding and strapping requirements.

References.—Methods of testing, definitions. *See* 300.4, 300.6. Canvas. *See* 303.1.

319.95 Sanitary Napkins

319.96 Horse Blankets

319.97 Cords, Straps, and Tape

References.—Twine, cord. *See* 302.3, 302.4. Insulating tape. *See* 719.56. Sash cord, wrapping cord. *See* 302.46, 302.47. Adhesive tape. *See* Adhesive plaster, 204.12.

319.98 Tents, Tarpaulins, and Wind Sails

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS28–32; 1931. Cotton Fabric Tents, Tarpaulins and Covers. A commercial standard selected and accepted by industry establishing a standard method of marking tents, tarpaulins, and covers to show the original gray goods weight per square yard without reference to finished or loaded weights, also to show type of fabric by markings, such as single filling duck, etc.

References.—Cotton duck. *See* 303.1, 303.5

319.99 Miscellaneous Specifications for Cotton Goods

References.—Canvas helmets. *See* 914.5. Cotton rags. *See* 390.5.

320–329 JUTE AND JUTE MANUFACTURES

321. JUTE AND JUTE BUTTS

321.1 JUTE PACKING

322. FABRICS OF JUTE

322.1 BURLAP

American Society for Testing Materials. D 174–25; 1925. Burlap Saturated With Bituminous Substances for Use in Water-proofing. Jute fabric saturated with either asphalt or coal-tar pitch, requirements on width, weight, strength, pliability, loss on heating, weight on saturant, also weight, ash, and composition of desaturated fabric, using A. S. T. M. standard test methods D 146.

U. S. Gov., Federal Specifications Board. 499; 1927. Jute Burlap. For grade known commercially as "firsts," requirements on weight and thread count, width, also in accordance with F. S. B. spec. 345 for textile materials.

References.—Burlap for bags. *See also* 322.2. Tolerances, methods of testing, definitions. *See* 300.4, 300.6.

322.2 JUTE BAGGING

American Society for Testing Materials. Tentative Specifications. D 275–27 T; 1927 Cuban (Jute) Raw Sugar Bags. For gunny sacking, requirements for weave, thread count, width, weight, tensile strength, and sizing; for bags, requirements for weight of standard bags, methods of measurement of width and length, test, procedure according to A. S. T. M. method D 39.

References.—Other burlap. *See* 322.1. Tolerances, methods of testing, definitions. *See* 300.4, 300.6. Cloth bags. *See* 957.1. Burlap waste classification. *See* 390.5.

322.3 BALING MATERIAL, JUTE

References.—Burlap, jute bagging. *See* 322.1, 322.2.

324. JUTE YARNS

324.1 JUTE YARNS AND ROVING

325. JUTE CORDAGE

325.1 JUTE CORD

References.—Standard sizes and varieties. *See* 326.

325.2 JUTE ROPE

References.—Standard sizes and varieties. *See* 326.

326. JUTE TWINE

U. S. Gov., Dept. of Commerce. Bureau of Standards. R 110–29; 1929. Soft Fiber (Jute) Twine. Simplified practice recommended and accepted by industry for limitation of stock varieties, covers standard stock varieties with grades, weights, average tensile strengths, and standard put-ups for fine finished twine, wrapping, sail, sewing, millers, and baling twine, heavy finished (India) twine, compress and ham twine, heavy finished ixtle twine, tube rope, paper makers' bale rope, pipecord, hide rope, box twine, jute rope, fleece twine.

U. S. Gov., Federal Specifications Board. T–T–911; 1930. Jute Twine. For 4 types of wrapping twine, fine India twine and heavy India twine, finished, and unfinished wrapping twine and tube rope, requirements on length per pound and breaking strength for 5 and 6 sizes for each type, methods of sampling and testing.

References.—Methods of testing. *See* 300.4.

329. MISCELLANEOUS MANUFACTURES OF JUTE

329.1 PADDING

329.2 HORSE BLANKETS

329.3 JUTE WEBBING

329.4 JUTE FELT.

Refeences.—Jute and hair felt. *See* 365.98.

330–339 FLAX, HEMP, AND RAMIE

330. GENERAL ITEMS

The Government of the Philippine Islands, Dept. of Agriculture and Natural Resources, Fiber Standardization Board. Administrative Order No. 5; 1927. Regulations governing the standardization and description of grades of Philippine fibers. Definitions of standard grades as regards tensile strength, cleaning, color, and length of fiber, for abaca (Manila hemp) specially prepared for tagal braid, for abaca prepared for cordage, for decorticated abaca, for canton, for pacol, for retted maguey and sisal, and for decorticated maguey and sisal.

331. CORDAGE, TWINE AND THREADS

331.1 CORDAGE, FLAX, HEMP, AND RAMIE

331.10 General Items

U. S. Gov., Dept. of Commerce. Bureau of Standards. T300; 1925. Development of a Standard Bending Test for Rope Yarns. Describes testing machine and gives recommended procedure for making bending test in which the original twist in the yarn is retained during test.

331.11 Fishing Lines

331.12 Houselines, Hemp

References.—Houseline and Navy houseline. *See* 331.16.

331.13 Cordage, Hemp and Ramie

References.—Hemp cordage. *See* 331.16.

331.14 Linen Blocking Cord

331.15 Ratline, Hemp

References.—Tarred ratline stuff. *See* 331.16.

331.16 Hemp Rope and Tarred Hemp Rope

American Petroleum Institute. Standard No. 9–B; 1930. Specifications for Manila Cordage. Tentative. For manila or abaca fiber rope, construction, sizes, weight, lubrication, length of drilling cable, bull and calf rope, general purpose rope, and strength of bull and calf rope and of general purpose rope, methods of test, recommended practice to obtain maximum life, standard form of grooves in sheaves.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stock; 1930. Report of committee recommending list of standard sizes to be carried in stock of manila rope.

U. S. Gov., Federal Specifications Board. 61b; 1929. Manila Rope. To be of manila or abaca fiber inspected by Government of Philippine Islands. permissible grades and mixtures of fiber, requirements on construction, dimensions, weight, breaking strength, lubricant content, methods of sampling and test.

U. S. Gov., Federal Specifications Board. T–C–621; 1930. Tarred Hemp Cordage. Requirements on percentage of tar, construction, weight, and breaking strength for 6 sizes of ratline stuff, 4 sizes of seizing stuff, 3 weights of marline, 2 sizes of spun yarn, 1 size of houseline, Navy houseline, roundline, and hambroline, methods of testing.

References.—Grades of fiber. *See* 330. Methods of testing, definitions. *See also* 331.10, 300.6. Sisal rope. *See* 341.2.

331.2 TWINE (FLAX, HEMP, RAMIE)

331.20 General Items

U. S. Gov., Dept. of Commerce. Bureau of Standards. R92–28; 1928. Hard fiber Twines (Ply and Yarn Goods). Simplified practice recommended and accepted by industry establishing a limited list of standard kinds and put-ups for hard fiber twines, covering quality, ply, weight, and tensile strength for laid manila, laid and twisted java, laid and twisted new zealand, and twisted sisal.

331.21 Flax Twine

American Railway Assn., Telegraph and Telephone Section. 2–G–18; 1925. Twelve Ply Cable Sewing Twine. Waxed twine of flax fiber for use in forming wires and cables, size of flax fiber strands, composition of wax, construction of twine, test requirements for yards per pound, tensile strength, solubility of wax, and construction.

U. S. Gov., Federal Specifications Board. T–L–411; 1930. Shot Lines for Line Throwing Guns. For 3 sizes of 3-strand flax twine line, requirements on lay, diameter, circumference, length, weight, and breaking strength, methods of sampling and test.

References.—Standard kinds and put-ups. *See* 331.20. Methods of testing, definitions. *See also* 331.10, 300.6. Other shot lines for line carrying guns. *See* 619.1.

331.22 Hemp Twine

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Twine for Roping Dry Sausage. Twine for Roping Genoa and Salami Sausage. Requirements on size of hemp, number of ply, weight, and tensile strength.

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Twine for Stringing Sweet Pickled Hams and Picnics. 3 ply, No. 6 india hemp, weight and tensile strength requirements.

U. S. Gov., Federal Specifications Board. T–T–901; 1931. Hemp Twine. For polished and commercially stainless fine hemp twine, 6 sizes, requirements on number of plies, weight, and average breaking strength, methods of test including test for strain.

References.—Standard kinds and put-ups. *See* 331.20. Methods of testing, definitions. *See* 331.10, 300.6. Grades of fiber. *See* 330.

331.24 Marlin Twine

331.25 Impregnated Twine

331.3 THREAD OF FLAX, HEMP, RAMIE

U. S. Gov., Federal Specifications Board. V–T–291; 1930. Linen Thread. For 3 types, three-cord (stitching), lock-stitch twist, and hand shoe thread, requirements on freedom from sizing, loading, adulterants, etc., on length per pound and average breaking strength for several sizes, twist per inch for lock-stitch-twist thread, in conformity with F. S. B. spec. 345 for textile materials.

References.—Methods of testing textile materials. *See* 300.4.

331.4 OAKUM

332. CABLES (HEMP, FLAX, RAMIE)

American Petroleum Institute. Standard No. 9–B: 1930. Manila Cordage. Tentative. Includes drilling cable and rope, requirements on construction, sizes, weight, and length, lubrication, strengths of bull and calf rope, methods of test.

333. FABRICS OF FLAX

333.1 DOWLAS LINEN

333.2 HOLLANDS, BROWN

333.3 TOWELING, CRASH, HUCK

References.—Mixed cotton and linen crash toweling. *See* 304.91. Standard sizes and kinds of towels. *See* 319.3.

333.4 DAMASK, BLEACHED AND UNBLEACHED

333.9 MISCELLANEOUS FABRICS OF FLAX

References.—Varnished cambric electrical insulating cloth and tape. *See* 719.56. Tracing cloth. *See* 392.12. Cambric and holland cloth for window shades. *See* 392.22.

334. FABRICS OF HEMP AND RAMIE

335. COLLARS AND CUFFS OF FLAX

339. MISCELLANEOUS MANUFACTURES OF FLAX, HEMP, AND RAMIE

339.1 HOSE

References.—Rubber, cotton, and linen hose. *See* 202.

339.2 RUGS

References.—Woolen rugs. *See* 366.1.

339.3 TABLE LINEN

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes tablecloths, napkins, and tray cloths of linen, standard sizes.

References.—Cotton table cloths and napkins. *See* 316.1, 316.2.

339.4 LINEN TAPE AND REFILLS

References.—Varnished cambric electrical insulating tape. *See* 719.56.

339.5 LINEN TOWELS

339.50 General Items

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes towels, linen and union linen, for cabin service, lavatories, pantry, waiter, and barber service, standard dimensions.

339.51 Linen Crash Towels

References.—Standard sizes. *See* 339.50. Mixed cotton and linen crash toweling. *See* 304.91.

339.52 Linen Hand Towels

339.53 Linen Dish Towels

339.54 Turkish Bath Towels, Linen

339.6 STREET BLANKETS

References.—Standard sizes of bed blankets. *See* 369.21.

339.7 FLAX PACKING

References.—Flax packing. *See* 707.22.

340–349 MISCELLANEOUS VEGETABLE FIBERS, STRAW, OR GRASS

341. CORDAGE

341.1 MANILA ROPE AND TWINE

References.—Manila rope. *See* 331.16. Hemp twine. *See* 331.22.

341.2 SISAL ROPE AND TWINE

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment. 1928. Hide Rope. Unoiled, 2 ply, extra fine sisal, with 15 per cent Mexican sisal, weight and 200 pound tensile strength requirement.

U. S. Gov., Dept. of Commerce, Bureau of Standards R 92–28; 1928. Hard Fiber Twines (Ply and Yarn Goods). Simplified practice recommended and accepted by industry establishing a limited list of standard kinds and put-ups for hard fiber twines, covering quality, ply, weight, and tensile strength for twisted sisal and other fibers.

References.—Fiber grades. *See* 330. Methods of testing, definitions. *See* 331.10, 300.6.

342. STRAW HATS AND HAT MATERIALS

344. ARTIFICIAL SILK MANUFACTURES

References.—Rayon and manufactures thereof. *See* 397.

349. OTHER MANUFACTURES OF VEGETABLE FIBERS, STRAW, OR GRASS

349.1 MATS AND MATTING (FIBER, GRASS, STRAW)

349.2 MATTRESS, KAPOK

349.3 PILLOWS, KAPOK

349.4 KAPOK PADS

349.5 KAPOK LIFE COATS, JACKETS, AND BUOYS

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Life Preservers of Kapok. Mandatory requirements on weight of kapok provided, prolonged buoyancy test, weight and buoyancy test of kapok collar.

360–369 WOOL AND HAIR AND MANUFACTURES

360. GRADES, DEFINITION, AND TESTS OF WOOL

American Society for Testing Materials. Tentative Test Methods. D 232–25T; 1925. Methods of Testing Grease Wool and Allied Fibers for Scoured Content. Procedure for weighing sample, scouring, drying, and computation of yield of scoured wool, for wool in the fleece, necks, pieces, bellies, pulled wool, and colonial scoured.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 100; 1926. Official Standards of the U. S. for Grades of Wool and Wool Top. Permissive standards, definitions of 12 grades of wool and wool tops as regards diameter of fiber compared to standard samples in custody of Dept. of Agriculture.

361. WOOL UNMANUFACTURED

361.1 WOOL

National Assn. of Wool Manufacturers. Definitions of Wool; 1924. General definitions for clean wool, shrinkage, clean content of wool, and normal condition of wool as to moisture.

References.—Standard grades, methods of testing wool. *See* 360.

362. HAIR, UNMANUFACTURED

362.1 CURLED HORSEHAIR

U. S. Gov., Federal Specifications Board. C–H–111; 1930. Horse Hair, Curled. For horsemane hair and for horsetail hair, requirements on percentage of natural black hair, cleanliness, preparation, permissible amounts of short hair, method of sampling and testing.

362.2 CURLED MATTRESS HAIR

References.—Curled horse hair. *See* 362.1.

362.3 UPHOLSTERY HAIR

References.—Curled horse hair. *See* 362.1.

363. REWORKED WOOL

363.1 WOOL WASTE

American Electric Railway Engr. Assn. Misc. Methods and Practices. E217–26; 1926. Specification for Wool Waste. Requirements for the yarn, permissible moisture, dirt, other than wool fibre and method of testing for determining these quantities.

American Railway Assn. Mechanical Div. New Waste for Journal Box Packing; 1929. Either cotton or wool waste or a combination of the two, includes for wool waste permissible amount of resilient material, dirt, grease, and moisture, permissible sources for the wool yarn.

U. S. Gov., Federal Specifications Board. DDD–W–116; 1931. Wool Waste, Colored. Requirements on content of woolen carpet and merino yarns, on content of wool and other fibers, minimum length of yarns, standard moisture content, permissible maximum moisture content and tare, to conform to F. S. B. spec. 345 for textile materials.

References.—Methods of testing. *See also* 360, 300.4 Cotton waste. *See* 301.11.

363.2 WORSTED ZEPHYR

364. WOOL, PARTLY MANUFACTURED

365. FABRICS WHOLLY OR CHIEFLY OF WOOL AND HAIR

365.0 GENERAL ITEMS

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 2. To Determine Amount of Wool and Silk in Fabric. Test procedure using method of weighing before and after dissolving out silk with hydrochloric acid.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 11. To Determine the Presence of Sulphur Bleach in Wool. Test procedure to determine whether a sulphur bleach or a peroxide bleach has been used, using method of boiling with ammoniated alcohol and testing with silver nitrate, refers to wool fabrics only.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 12. To Determine the Presence of Sulphur in Wool Fabric. Test procedure using method of heating with solution of lead oxide and caustic and testing by resulting color.

Textile Color Card Assn. of the U. S. (Inc.). Standard Color Card. 8th ed.; 1928. Card containing 192 textile color samples standardized and issued by this assn., each color having a name and number. The association also issues spring and fall seasonal color cards showing standardized colors forecast for the season.

Textile Color Card Assn. of the U. S. (Inc.). Indorsed by American Assn. of Woolen and Worsted Manufacturers. Woolen Color Card, Spring Season 1929. Card containing 46 woolen color samples, standardized and issued by this association, each color having a name and number.

365.1 WOOLEN CLOTH DESIGNATED BY NAME

365.11 Beaver Cloth

365.12 Bedford Cord and Whipcord

365.13 Broadcloth

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Includes 16 ounce and 14 ounce broadcloth finish material for blue uniforms and undress blouses, requirements on general quality of wool, thread count, tensile strength, and weight, type of dye used.

References.—Tolerances, methods of testing, definitions. *See* 365.0, 300.4, 300.6.

365.14 Doeskin Cloth

365.15 Fearnaught Cloth

365.16 Kersey

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Overcoat. For 2 grades of dark blue cloth, kersey finish, requirements on grade of wool, thread count, strength, weight, kind of dye, cut and construction of coat.

References.—Tolerances, methods of testing, definitions. *See* 365.0, 300.4, 300.6.

365.17 Melton

365.18 Serge

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Includes blue serge material for uniforms and undress blouses. Requirements on general quality of wool used, thread count, tensile strength, weight, quality of dye, and shrinkage.

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Serge raincoat. For the dark blue serge material, requirements on quality of wool, thread count, strength, weight, type of dye, kind and quality of waterproofing material.

References.—Tolerances, methods of testing, definitions. *See* 365.0, 300.4, 300.6.

365.2 WOOLEN CLOTH DESIGNATED BY COLOR

365.21 Dark Blue Cloth

References.—Dark blue serge. *See* 365.18. Blue broadcloth. *See* 365.13. Dark blue kersey. *See* 365.16.

365.22 Light Blue Cloth

References.—Blue broadcloth, blue serge. *See* 365.13, 365.18.

365.23 Scarlet and White Cloth

365.24 Olive Drab

365.25 Gray Uniform Cloth

365.26 Forestry Green and Elastique Green Cloth

365.27 Khaki Woolen Cloth

365.9 MISCELLANEOUS SPECIFICATIONS FOR WOOL AND HAIR CLOTH

365.91 Billiard Cloth

365.92 Bunting

References.—Wool bunting. *See* 306.42.

365.93 Flannel

References.—Cotton flannel. *See* 304.2.

365.94 Prisoners' Uniform Cloth

365.95 Facing Cloth

365.96 Haircloth

U. S. Gov., Dept. of Commerce. Bureau of Standards; T231. Tentative Standard Test Methods and Percentages of Oil and Moisture in Hair Press Cloths. For press cloth used in the oil pressing industry, procedure for sampling, for analysis for moisture content, oil content, and water-soluble material, recommended standard for permissible content of moisture, oil, and water soluble material.

References.—Methods of testing. *See also* 365.98. Hair felt. *See* 365.98.

365.97 Mohair Serge

365.98 Felt

American Marine Standards Committee. E No. 18–1928. Hair Felt for Insulation. Specification for material, weight and size of hair felt. Substantially identical with F. S. B. specification for the same material.

American Railway Engineering Assn.; 1929 Manual. Iron and Steel Structures. Waterproofing and Drainage of Solid Floor Railway Bridges; 1927. Includes rag felt, weight, ash, and fiber content of felt, weight, strength, pliability, dimensions of felt saturated with asphalt or pitch. Conforms closely to A. S. T. M. serial D 172–23T.

American Society for Testing Materials. D 146–27; 1927. Methods of Testing Felted and Woven Fabrics Saturated with Bituminous Substances for Use in Waterproofing and Roofing. Sampling, inspection for weight and dimensions, test procedure for moisture, strength, pliability, absorption, voltality of asphalt, extraction and distillation of coal-tar products, desaturation of fabric, weight and ash determinations.

American Society for Testing Materials. D 224–27; 1927. Asphalt Roll-Roofing Surfaced with Powdered Talc. For medium and heavy weight roofing felt saturated and coated on both sides with asphalt, general quality of felt, test requirements for degree of saturation, requirements on width, weight, pliability, voltatility, percentage of saturant, ash, weight of mineral surfacing, using A. S. T. M. methods D 228.

American Society for Testing Materials. D 228–31T; 1931. Tentative Methods of Testing Asphalt Roll Roofing Surfaced with Fine Talc, Granular Talc, or Mineral Granules; Also Asphalt Shingles Surfaced with Mineral Granules. Method of sampling, determination of size and weight, pliability of roofing, loss on heating, percentage of saturant, weight of felt, ash, and mineral surfacing.

American Society for Testing Materials. D 249–27; 1927. Heavy Weight Slate Surfaced Asphalt Roll-Roofing and Heavy Weight Slate Surfaced Asphalt Shingles. Roofing felt saturated and coated on both sides with asphalt, surfaced on weather side with granulated slate, general quality of felt and test for degree of saturation, requirements on width, weight, pliability, volatility, percentage saturant, ash, tested according to A. S. T. M. method D 228.

American Society for Testing Materials. Tentative Methods. D 272–29T; 1929. Methods of Analysis of Roofing Felt for Fiber Composition. Sampling procedure, requirements for microscope, graticule, dropper, preparation of Herzberg stain, preparation of sample and test procedure using fiber count method.

Asphalt Shingle and Roofing Institute. Dry Felt Tests; 1921. Sampling, test procedure for measuring weight, thickness, moisture content, tensile strength, pliability, ash, fibers present by means of microscope and stains, counting of fibers.

Asphalt Shingle and Roofing Institute. Recommended Tests. Test to Ascertain the Thoroughness with Which Felt Will Saturate; 1922. Test procedure for drying samples and saturating with kerosene.

Asphalt Shingle and Roofing Institute. Recommended Test. Test to Determine the Speed with Which Felt Will Saturate; 1923. Test procedure for measuring the speed of absorption of zylol by capillarity.

National Hair and Jute Felt Mfrs. Assn. Standard Weights and Loom Run Widths; 1929. For jute and hair felts made by the needle loom punching process, 13 standard ounce weights per square yard and 7 standard rough widths have been adopted for roll goods.

Society of Automotive Engineers 1931 Handbook. Felt; 1929. For 13 grades, requirements on percentages of wool, cotton, and ash, on color, thickness tolerances, and weight, permissible alcohol, ether, and water extracts for the better grades.

Underwriters Laboratories. Class C Asphalt Rag-Felt Sheet Roofing and Shingles; 1929. For roofing felt of vegetable and animal fibers, requirements on general quality, permissible ash, and weight for 2 weight grades.

U. S. Gov., Federal Specifications Board. 158; 1924. Hair Felt. For cattle hair felt suitable for pipe covering and general low temperature insulating purposes, requirements on general quality, width, weight and area per roll for thicknesses up to 2 inches.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Pipe Covering. Wool felt sectional covering, minimum thickness, lining and jacket materials, dimensions, finish, and application of bands, types of plastic materials and their applications to valves and fittings, for hot and cold water supplies.

References.—Hair press cloth. *See* 365.96. Rag stock for felt. *See* 390.5. Felt base rugs. *See* 391.

366. CARPETS AND RUGS OF WOOL

366.1 RUGS

References.—Axminster, velvet, and Wilton rugs. *See* 366.2. Methods of testing. *See also* 365.0, 300.4. Steamer rugs. *See* 369.7. Felt base rugs. *See* 391.

366.2 CARPETS

U. S. Gov., Federal Specifications Board. DDD–C–61; 1931. Plain Velvet Carpets and Rugs. For 1 grade formerly called wilton velvet or plain wilton, requirements on kinds of materials, general quality of yarn, type of dye, average dissections, shots, pitch, wires, and weights of materials, weight and fading tests, furnishing of samples by contractor.

U. S. Gov., Federal Specifications Board. 502; 1927. Axminister Rugs and Carpets. Requirements on kinds of materials used, general quality of yarn, type of dye, average dissection, including ends, wires and weights of materials, weight and fading tests, furnishing of samples.

U. S. Gov., Federal Specifications Board. DDD–C–71; 1931. Wilton Rugs and Carpets. For 4 fabric types of worsted wilton and wool wilton rugs and carpets, definition of wilton fabric, construction requirements for worsted yarns, required type of dye, table of dissections giving frames, shots, pitch, wires, and weights of materials to be used as a guide in manufacture, weight and fading tests.

References.—Methods of testing. *See also* 365.0, 300.4.

367. WOOL KNIT GOODS

367.0 GENERAL ITEMS

American Society for Testing Materials. Tentative Specifications. D 231–28T; 1928. Tolerances and Test Methods for Knit Goods. Tolerances for width, weight, and count, apparatus and method of test for moisture regain, determination of grease, width, weight, wales and courses, bursting strength, percentages of cotton and wool according to A. S. T. M. method D 276, thickness according to D 39.

367.1 SOCKS AND STOCKINGS, WOOLEN

References.—Standard sizes, methods of measuring, colors. *See* 309.3. Tolerances, methods of testing. *See* 367.0, 365.0, 300.4.

367.2 KNIT WOOLEN UNDERWEAR

Associated Knit Underwear Mfrs. of America. For wool and wool-cotton underwear the standards given in commercial standard CS33–32, published by Bureau of Standards, have been adopted.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS33–32; 1931. Knit Underwear (Exclusive of Rayon). A commercial standard selected and accepted by industry establishing standard measurements and standard methods of measuring knit underwear, flat knit and ribbed types. Includes worsted, worsted-merino, wool, and wool-cotton underwear, ribbed union suits for men, boys, children, misses, and women, ribbed and flat knit shirts and drawers for men and boys, athletic and polo shirts for men, recommended practice on standard symbols for different models.

References.—Methods of measuring and standard measurements. *See also* 309.4. Tolerances and methods of testing. *See* 367.0, 365.0, 300.4.

367.3 HOODS AND TOQUES

367.4 JERSEYS AND SWEATERS

367.5 MUFFLERS AND SCARFS

367.6 BATHING TRUNKS, KNIT WOOL

367.7 WOOLEN GLOVES

References.—Rubber gloves. *See* 203.2, 204.52.

368. WOOL WEARING APPAREL (EXCEPT KNIT APPAREL)

368.1 WOOLEN BREECHES

References.—Breeches for uniforms. *See* 368.82.

368.2 COATS AND OVERCOATS

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Overcoat. For 2 grades of dark blue kersey finish overcoats, dependent on weight and texture of material used, requirements on grade of wool, thread count, strength, weight, kind of dye, material and cut and construction of double breasted coat, number and size of pockets, shoulder marks, etc.

References.—Coats for uniforms. *See* 368.82. Raincoats, oilskin coats. *See* 392.54, 392.53. Cotton coats. *See* 311.1. Methods of testing. *See* 365.0, 300.4. Wool grades. *See* 360.

368.3 BATH ROBES

368.4 WOOLEN SKIRTS

References.—Dress patterns. *See* 311.2.

368.5 WOOLEN SHIRTS

References.—Standard measurements and methods of measuring. *See* 311.5. Undershirts. *See* 367.2.

368.6 WOOLEN AND FELT SLIPPERS

368.7 WOOLEN DRAWERS AND UNDERSHIRTS

References.—Knit wool underwear. *See* 367.2.

368.8 SUITS AND UNIFORMS OF WOOL

368.81 Woolen Suits

368.82 Woolen Uniforms

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Blue uniform. For uniform of either of 2 weights of blue broadcloth finish cloth or of 1 weight of blue serge, requirements on grade of wool used, thread count, tensile strength, weight, kind of dye, shrinking of material, materials and construction of buttons, lace, rank insignia, construction and cut of trousers and double breasted roll lapel coat, number and sizes of pockets, etc.

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Undress blouse. For blouse of broadcloth finish blue cloth or of blue serge, requirements on grade of wool used, thread count, tensile strength, weight, kind of dye, shrinking of material, number and construction of buttons, construction of single breasted coat, number and size of pockets, etc.

References.—Wool grades. *See* 300.1. Methods of testing. *See* 365.0, 300.4. Cotton uniforms. *See* 311.6.

368.9 MISCELLANEOUS WOOL WEARING APPAREL

References.—Caps and hats. *See* 395.

369. MISCELLANEOUS MANUFACTURES OF WOOL AND HAIR

369.1 BRAIDS AND CORDS

References.—Service stripes. *See* 369.6.

369.2 BLANKETS

369.21 Bed Blankets

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes woolen blankets and cotton blankets, standard sizes and grades.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R11; 1924. Bed Blankets. Simplified practice recommended and accepted by industry establishing a limited list of standard widths and lengths.

369.22 Horse Blankets

369.23 Printer's Blankets

369.3 MATTRESSES, HAIR

References.—Curled horsehair. *See* 362.1.

369.4 HAIR PILLOWS

369.5 FLAGS AND FLAG KITS

References.—Wool bunting, flags. *See* 306.42, 306.43.

369.6 CHEVRONS AND SERVICE STRIPES

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Rank and corps insignia. Standard number and widths of stripes for various service ranks, size and standard designs of insignia for various services, construction and gold or silver content of gold and silver lace, general quality of silk braid, etc.

369.7 STEAMER RUGS

American Marine Standards Committee O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. For woolen steamer rugs for cabin service, one standard kind and size.

369.9 MANUFACTURES OF HAIR AND WOOL NOT ELSEWHERE CLASSIFIED

References.—Hair belting. *See* 314.1. Wool rags. *See* 390.5. Hair floor sweeps. *See* 981.4. Brushes of bristle and hair. *See* 982.

370–379 SILK AND MANUFACTURES THEREOF

370. GENERAL ITEMS

American Society for Testing Materials. Tentative Specifications. D 231–28T; 1928. Tolerances and Test Methods for Knit Goods. Tolerances for width, weight, and count, apparatus and method of test for moisture regain, determination of grease, width, weight, wales and courses, bursting strength, percentage of cotton and wool according to A. S. T. M. method D 276, thickness according to A. S. T. M. D 39.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 2. To Determine Amount of Wool and Silk in Fabric. Test procedure using method of weighing, dissolving the silk in hydrochloric acid, washing and reweighing.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 6. To Determine the Amount of Natural Silk and Rayon in Fabric. Test procedure using method of weighing before and after dissolving out the natural silk with copper sulphate.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 7. To Distinguish Domesticated Silkworm Silk from Tussah (Wild Silk). Test procedure using the method of dissolving out the domesticated silkworm silk with hydrochloric acid, weighing sample before and after.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 8. To Determine if Silk has Been Weighted with Tin Salts. Test procedure using color test for distinguishing type of material after treating with logwood-acetic acid solution.

Textile Color Card Assn. of U. S. (Inc.). Standard Color Card. 8th ed.; 1928. Card containing 192 textile color samples standardized and issued by this assn., each color having a name and number. The assn. also issues spring and fall seasonal color cards showing standardized colors forecast for the season.

371. SILK UNMANUFACTURED

Silk Assn. of America (Inc.). Raw Silk Rules; 1924. Rules governing transactions in raw silk, including required weight of bale and permissible variation, permissible boil-off percentages, permissible variation from standard grade sizes.

Silk Assn. of America (Inc.). Second Report of the Raw Silk Classification Committee; 1926. Includes definitions of raw silk, standard condition, and silk defects, includes standard test procedure for sizing test, serimeter and serigraph tests, evenness and cleanness test, and defects test, all for purposes of classification, also cohesion and winding tests.

Silk Assn. of America (Inc.). A Raw Silk Classification with Methods of Testing; 1929. Definitions of 9 quality grades of Japanese raw silk, Japanese white and yellow, any size, 10 bale lots, as determined by cleanness, evenness, neatness, size deviation, size variation, strength, elongation, and winding test, 6 of above grades identical with classes of National Raw Silk Exchange for 13/15 Japan raw silk. Publication includes amendments to some of the methods of test given in " Second report of the Raw Silk Classification Committee; 1926."

372. SILK SKEINS, COPS, OR WARPS

372.0 GENERAL ITEMS

Silk Assn. of America, Inc. Thrown Silk Rules; 1929. Rules governing transactions in thrown silk, includes basis of weight determination, permitted boil-off percentage, required twist and permissible variation therefrom, required length of skeins and permissible variations, for organzine, tram, and crêpe.

372.1 BRAIDING SILK

References.—Thrown silk rules. *See* 372.0. Tests for silk fiber and weighting of silk. *See* 370. Standard colors. *See* 370. Raw silk classification. *See* 371. Textile testing methods. *See* 300.4.

372.2 EMBROIDERY SILK

U. S. Gov., Federal Specifications Board. V–T–301; 1931. Silk Thread. Includes embroidery silk, white, black, and colored. Requirements on freedom from loading, number of plies, weight and breaking strength for 3 sizes, fastness to light and laundering tests, in conformity with F. S. B. spec. 345 for testing textile materials.

References.—*See* references under 372.1.

372.3 SEWING SILK

U. S. Gov., Federal Specifications Board. V–T–301; 1931. Silk Thread. Includes sewing silk suitable for hand sewing, white, black, and colored. Requirements on construction, weights and breaking strengths for 4 sizes, tests for fastness to light and laundering, methods of test in accordance with F. S. B. spec. 345 for textile materials.

References.—*See* references under 372.1.

372.4 SPUN SILK

References.—See references under 372.1.

372.5 TWIST

U. S. Gov., Federal Specifications Board. V–T–301; 1931. Silk Thread. Includes machine twist and tailor's buttonhole twist, white, black, and colored. Requirements on construction, freedom from loading, weights and breaking strengths for 9 sizes of machine twist and 5 sizes of buttonhole twist, tests for fastness to light and laundering, methods of test in accordance with F. S. B. spec. 345 for textile materials.

References.—See references under 372.1.

372.6 SURGEONS' SILK

References.—See references under 372.1.

372.7 INSULATING SILK

References.—See references under 372.1.

372.8 SILK THREAD FOR AIRCRAFT FABRIC

References.—See references under 372.1.

373. FABRICS WHOLLY OR CHIEFLY SILK

373.1 RIBBONS

373.2 SILK CLOTH

373.20 General Items

Silk Assn. of America (Inc.), Standards for the Examination of Finished Broad Silks; 1931. Classification of finished broad silks into 3 classes, standard method of examination and recording of defects, determination of percentage grading due to defects, and definitions and classification of defects.

373.21 Balloon and Parachute Silk

373.22 Banner Silk

373.23 Bolting Silk

References.—Silk screens for grading abrasive sands. *See* 379.4.

373.24 Cartridge Bag Silk

373.25 Silk and Satin Lining

373.26 Silk Velvet

373.27 White Silk for Stencils

373.28 Silk Cloth for Bags

373.29 Miscellaneous Silk Cloth

Silk Assn. of America. Spun Silk Division. Minimum Specifications for Lavelle; 1929. Lavelle, a registered trade name for a wash silk, requirements on size and number of ends and picks in warp and filling, minimum fabric width, use of pure dye, and color fastness test.

References.—Tolerances, methods of testing, colors. *See* 373.20, 370., 300.4.

374. SILK BANDINGS, BINDINGS, WEBBINGS, ETC.

374.1 SILK BRAID

References.—Braid for uniforms. *See* 369.6.

374.2 SILK TAPE

References.—Silk electrical tape. *See* 719.56.

374.3 RUBBERIZED SILK TAPE

375. WEARING APPAREL OF SILK

375.1 CRAVATS

375.2 SILK HOSIERY

References.—Standard sizes, methods of measuring, standard colors. *See* 309.2.

375.3 SILK WAISTS

References.—Dress patterns. *See* 311.2.

375.4 SILK CLOTHING FOR AVIATORS

376. HANDKERCHIEFS AND WOVEN MUFFLERS OF SILK

378. LACES, VEILS, NETS, AND EMBROIDERIES OF SILK

References.—Gold and silver lace. *See* 399.9.

379. MISCELLANEOUS MANUFACTURES OF SILK

379.1 CORDS, SILK

379.2 FLAGS

References.—Railway signal flags. *See* 306.43.

379.3 FRINGE

379.4 GRADING SCREENS OF SILK CLOTH

Abrasive Paper and Cloth Manufacturers Exchange. Abrasive Coated Products; 1929. Includes silk screens used in grading abrasive sands, mesh number, screen number and typical count of warp and filler.

References.—Methods of testing. *See* 370, 300.4.

390–399 MISCELLANEOUS TEXTILE PRODUCTS

390. GENERAL ITEMS

390.4 SPECIFICATIONS AND TOLERANCES FOR RETAIL FABRIC MEASURING DEVICES

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of U. S. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Fabric Measuring Devices. For devices designed for use in retail sales, requirements on size and spacing of graduations, permissible principles in the making of computing charts, permissible tolerances on both increasing and decreasing registrations.

390.5 CLASSIFICATION OF RAG AND TWINE WASTE STOCK

Felt Manufacturers Assn. Classification of Rag Stock; 1928. Definitions of 6 grades of rag stock with materials suitable for inclusion in each grade, No. 1 roofing rags of part wool, No. 2 roofing rags of cotton, No. 3 of brussels and hard back carpets, No. 4 roofing rags of tailor rags with paper, No. 6 of city dump rags, requirements on freedom from rubbish and moisture.

National Assn. of Waste Material Dealers (Inc.). Classification Covering Bagging. Undated. Definitions of classes with numbers for gunny, burlap, and jute bagging.

National Assn. of Waste Material Dealers (Inc.). Classification for Mixed Twines. Undated. Definition of one class with allowable percentage of straight sisal.

National Assn. of Waste Material Dealers (Inc.). Woolen Rag Classification. 1921. Definition of grades with allowable percentages in rejections and tare for mixed soft woolens, mixed rough cloth, mixed skirted cloth, and merchant tailor clips.

Writing Paper Manufacturers Assn. Cotton Rag Classification; 1922. Name and definition of grade for grades of old rags, new rags, and hosiery. (Printed by National Assn. of Waste Material Dealers (Inc.).)

390.6 SIZINGS FOR FABRICS

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 45, Gum Arabic Sizing. Formula 50, Gelatine Sizing. Formula 51, Finish and Sizing for Organdies. Formula 52, Rug Sizing. List of required materials and amounts of each, method of preparation.

391. LINOLEUM FLOOR COVERING

Linoleum and Felt Base Mfrs. Assn. Report of Committee on Standardization and Simplification; 1931. Felt Base Rugs. Recommendations on maximum number of patterns for various sizes, standard rug sizes, point limits for felt, classification and packing of rugs.

Linoleum and Felt Base Mfrs. Assn. Report of Committee on Standardization and Simplification; 1931. Linoleum. Recommendations on limited list of standard gauges and maximum number of colors for each gauge, classification and packing, for battleship and plains, jaspes, cork carpet, inlaids, and printed linoleums.

U. S. Gov., Federal Specifications Board. LLL–L–351; 1931. Battleship Linoleum. Requirements on ingredients, color, and finish according to sample agreed upon, width, adhesion of burlap backing, seasoning, thicknesses and tolerances for 3 thickness grades, minimum weights, test requirements for indentation, pliability, and water absorption. Recommended for use on board ships and on floors of hospitals and office buildings.

U. S. Gov., Federal Specifications Board. LLL–L–361. 1931. Plain Linoleum, Inlaid, and Printed. Covers plain, jaspe, granite, straight-line and molded inlaid, and printed linoleums, requirements on ingredients, with finish, color, and pattern according to sample agreed upon, seasoning, widths, weights, indentation test, weight, thicknesses and tolerances, pliability test.

392. COATED, FILLED, AND WATERPROOFED FABRICS

392.1 COATED FABRICS

392.11 Enameled Cloth

392.12 Tracing and Blueprint Cloth

U. S. Gov., Dept. of Commerce. Bureau of standards. C63; 1917. Specification of the Transparency of Paper and Tracing Cloth. Describes a standard method of specifying the transparency using principle of contrast ratio, description of apparatus and method of test, directions for making application test.

U. S. Gov., Federal Specifications Board. CCC–C–531; 1931. Tracing Cloth. For clear transparent cloth and pure white (pencil) cloth, requirements on general quality of coating, thread count and tensile strength of cotton cloth, color, drawing and erasing qualities, methods of test.

U. S. Gov., Federal Specifications Board. CCC–C–536; 1931. Printed Tracing Cloth. For profile cloth, cross-section cloth, logarithmic cloth, and plan profile cloth, requirements on general quality of coating, finish, drawing and erasing tests, to be in accordance with accepted samples, methods of test.

References.—Methods of testing. *See* 300.4.

392.13 Varnished Cloth

References.—Varnished cambric cloth and tape and friction tape for electrical purposes. *See* 719.56.

392.2 BOOK AND WINDOW SHADE CLOTH AND WINDOW SHADES

392.21 Book Cloth

392.22 Shade Cloth

U. S. Gov., Federal Specifications Board. CCC–C–521; 1930. Shade Cloth. For translucent cambric (handmade tinted), opaque cambric (handmade), holland, and pyroxylin impregnated shade cloths, requirements on materials entering into construction and methods of application, standard colors, fastness of colors, thread count, breaking strength, standard widths, lengths, testing according to F. S. B. spec. 345.

References.—Tolerances, methods of testing, definitions. *See* 300.4, 300.6. Window shades. *See* 392.23.

392.23 Window Shades

U. S. Gov., Federal Specifications Board. 367b; 1928. Window Shades, Rollers, Slats, Cords, and Accessories. For window shades with wooden rollers or metal rollers, requirements on diameters of rollers and lengths of springs for various sizes of shades, standard shade widths for translucent cambric, opaque cambric, holland, and pyroxylin shades, size of slat, size and strength of cord, construction of hem, brackets, etc., shade cloth according to F. S. B. spec. 555.

References.—Shade cloth. *See* 392.22.

392.3 RUBBERIZED FABRIC

American Assn. of Textile Chemists and Colorists 1930 Yearbook. Report of Subcommittee on Rubberized Fabrics; 1930. Method of test applicable to all fibers whether chromium is present or not, for determination of copper, manganese, and iron.

References.—Electrical insulating rubberized tape. *See* 719.56. Cotton fabrics for rubber coating. *See* 304.71.

392.4 WATERPROOF CLOTH

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Waterproofing Fabric. For a woven cotton fabric, requirements on thread count, degree of saturation with asphalt, weight of asphalt added, tensile strength, and elongation of treated fabric.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Waterproofing and Drainage of Solid Floor Railway Bridges; 1927. Includes asphalt treated fabric, weight, ash, and thread count of cotton fabric, width, weight, moisture content, strength, pliability, loss on heating, weight of saturant for treated cotton fabric. Conforms closely to A. S. T. M. D 173–27.

American Society for Testing Materials. D 146–27; 1927. Methods of Testing Felted and Woven Fabrics Saturated with Bituminous Substances for Use in Waterproofing and Roofing. Sampling, inspection for weight and dimensions, test procedure for moisture, strength, pliability, absorption, volatility of asphalt, extraction and distillation of coal-tar products, desaturation of fabric, weight and ash determinations.

American Society for Testing Materials. D 173–27; 1927. Woven Cotton Fabrics Saturated with Bituminous Substances for Use in Waterproofing. Requirements on width and weight of saturated and desaturated fabric, moisture content, average strength, pliability, loss on heating, weight of saturant, percentage ash and maximum thread count of fabric, using A. S. T. M. methods of test D 146.

References.—Tolerances, methods of testing. *See also* 300.4. Asphalt for waterproofing, tar for waterproofing. *See* 505.16, 505.36. Oiled waterproof cloth for oilskins. *See* 392.53. Waterproof serge. *See* 392.54. Cotton fabrics for rubber and pyroxylin coating. *See* 304.71.

392.5 WATERPROOF CLOTHING

392.51 Ponchos

392.52 Slicker

392.53 Oiled Clothing

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Oilskin Coat. For coat made from closely woven black oiled cloth of loose fit type, requirements on cut and construction, number of pockets, etc.

392.54 Rain Clothing

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Serge raincoat. For raincoat made of dark blue waterproofed serge, requirements on quality of wool, thread count, strength, weight, type of dye, kind and quality of waterproofing material, for the serge material, construction and cut of slip-on style double breasted raincoat, size of pockets, etc.

References.—Methods of testing fabrics, definitions. *See* 365.0, 300.4, 300.6. Oilskin coat. *See* 392.53.

392.6 OILCLOTH

U. S. Gov., Federal Specifications Board. 498; 1927. White Table Oilcloth. For grade known as "firsts," requirements on weight of cotton cloth backing, width and length of roll, breaking strength, weight, cracking, with methods of test in accordance with F. S. B. spec. 345 for textile materials.

References.—Tolerances, methods of testing, definitions. *See* 300.4, 300.6.

393. LABELS, WOVEN

394. WEBBING

394.1 KHAKI WEBBING

394.2 OLIVE-DRAB WEBBING

394.3 JUTE WEBBING

394.4 WEBBING STRAPS

394.5 ELASTIC CORD AND ELASTIC WEBBING

Webbing Mfrs. Exchange. Minimum Standard for Elastic Webbing; 1928. Minimum allowable rubber thread size, standard lengths of web in rolls for fly shot webs and for gang loom webs, normal and maximum cuts allowed in roll and maximum pieces permitted in roll.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R112–29; 1929. Elastic Shoe Goring. Simplified practice recommended and accepted by industry covering a standard schedule for stock varieties of unmercerized cotton elastic shoe goring, standard qualities and widths, with weight, size, and number of rubbers, weight of cloth, percentage stretch of finished goring for each quality grade.

References.—Tolerances, methods of testing, definitions. *See* 300.4, 300.6.

395. HATS AND CAPS (except straw or other fiber, or rubber)

395.1 CAPS

395.11 Cooks' and Bakers' Caps

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattress and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes caps for cooks, standard commercial sizes, no dimensions given.

395.12 Caps, Winter

395.13 Caps, Dress, Full Dress, and Special Dress

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Cap and cover. For a cap frame to support either a blue, white, or khaki top, requirements on general measurements, materials and construction of frame, cap body, visor, band, chin straps, blue cap top, white cap top, khaki cap top, and rain cover.

395.14 Olive-Drab Service and Officers' Caps

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Cap and cover. For a cap frame to support either a blue, white, or khaki top, requirements on general measurements, materials and construction of frame, cap body, visor, band, chin straps, blue cap top, white cap top, khaki cap top, and rain cover.

395.15 Summer Caps

References.—White caps for marine officers. *See* 395.13.

395.16 Watch Caps

395.17 White Caps, Marine Band and Officers'

References.—White caps, marine officers'. *See* 395.13.

395.18 Fur Caps

395.2 HATS, EXCEPT STRAW AND RUBBER HATS

395.21 Field Hats

395.22 Blue Denim Working Hats

395.23 Olive-Drab (Nurses') Hats

395.24 Olive-Drab (Officers') Hats

395.25 Hats, Southwester

395.26 Hats, Oiled Squam

396. BALLOON AND AIRSHIP FABRICS

References.—Tolerances, methods of testing, definitions. *See* 300.4. 300.6.

397. RAYON, CELANESE, AND MANUFACTURES THEREOF

397.0 GENERAL ITEMS

American Assn. of Textile Chemists and Colorists 1930 Yearbook. Report of subcommittee on rayon. Tentative method of identification of rayon including identification of cellulose acetate rayon, nitrocellulose rayon, cupra-ammonium rayon, and viscose rayon.

American Society for Testing Materials. Tentative Specifications. D 258–31T; 1931. Tolerances and Test Methods for Rayon. Definitions and classification of rayons, methods of distinguishing the various rayons from each other, permissible tolerances on yarn size, twist, and strength, methods of test, requirements on standard moisture regain for the various rayons.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 6. To Determine the Amount of Natural Silk in Rayon in Fabric. Test procedure using method of weighing before and after dissolving-out the natural silk with copper sulphate.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 13. To Distinguish Rayons From Each Other. Test procedure using color test after treating sample with sulphuric acid and iodine for distinguishing nitrocellulose, viscose, cupra-ammonium, cellulose acetate, and gelatine.

National Assn. of Hosiery and Underwear Manufacturers. Standard Maximum Percentage of Oil on Rayon Yarns Used in Knitting; 1927.

Textile Color Card Assn. of the U. S. (Inc.). Standard Color Card. 8th ed.; 1928. Card containing 192 textile color samples standardized and issued by this association, each color having a name and number. The association also issues spring and fall seasonal color cards showing standardized colors forecast for the season.

U. S. Gov., Dept. of Commerce. Bureau of Standards. RP61; 1929. A Multiple Strand Test for Yarns. Describes method of preparing test specimen and test procedure using multiple strands of yarn under uniform tension, test gives breaking strength and also the stress-strain relationship which is of particular value for rayon. Comparison is made with tentative specification D258–31T of Am. Soc. for Testing Materials.

References.—Nitrocellulose and tests of cellulose compounds. *See* 846.5.

397.1 RAYON KNIT GOODS

397.11 Socks and Stockings of Rayon

References.—Standard sizes, methods of measurement, standard colors of hosiery. *See* 309.2. Methods of testing fabrics. *See* 397.0, 300.4.

397.12 Rayon Underwear

Associated Knit Underwear Manufacturers of America. 22; 1928. Men's Rayon Knit Athletic Shirts (Pullover Shirts). Method of measuring and standard measurements and tolerances for a full range of sizes of ribbed and flat knit shirts. Suggested method of washing rayon knit underwear.

Associated Knit Underwear Manufacturers of America. 25; 1928. Men's Rayon Ribbed Knit Athletic Union Suits. Method of measurement, standard measurements and tolerances for a full range of union suits with no sleeves, button shoulder or button front, and short leg. Suggested method of washing rayon knit underwear.

Associated Knit Underwear Manufacturers of America. 26; 1928. Men's Rayon Flat Knit Athletic Union Suits. Method of measuring, standard measurements for, and tolerances, for a full range of sizes for union suits with no sleeves, button shoulder or button front and short leg. Suggested method of washing rayon knit underwear.

Associated Knit Underwear Mfrs. of America. Standard No. 33; 1930. Men's Rayon Track Pants. For elastic waist band type and elastic back type, standard measurements and tolerances for a full range of sizes. Suggested method of washing rayon knit underwear.

Associated Knit Underwear Mfrs. of America. Standard No. 107, 1930, Women's Flat Knit Rayon Union Suits (Bodice top, knee length). No. 108, 1930, Women's Knit Rayon Bloomers (Knee length, elastic at waist and knee). No. 109, 1930, Women's Rayon Vests (Bodice top). Standard measurements and tolerances for a full range of sizes. Suggested method of washing rayon knit underwear.

References.—Methods of measuring underwear. *See also* 309.4. Methods of testing fabric. *See* 397.0, 300.4.

397.13 Hoods and Toques of Rayon

397.14 Jerseys and Sweaters of Rayon

397.15 Rayon Mufflers and Scarfs

398. ABSORBENT COTTON, GAUZE, AND SURGICAL DRESSING

398.1 ABSORBENT COTTON

U. S. Gov., Federal Specifications Board. JJJ-C-561; 1931. Absorbent Cotton. For unsterilized type in roll and for sterilized type in package, 2 grades of each type, requirements on general quality, bleaching, freedom from lumps, dirt, foreign matter, etc., of the cotton material, neutrality and evaporation residue of water extract, permissible moisture and ash, required fiber length and absorbency, methods of test.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Purified Cotton (Absorbent Cotton). Physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Standard cotton grades. *See* 300.1.

398.2 GAUZE

398.21 Plain Gauze

U. S. Gov., Dept. of Commerce. Bureau of Standards. R86–28; 1928. Surgical Gauze. Simplified practice recommended and accepted by industry establishing a limited number of stock sizes and varieties covering widths and construction of surgical gauze and crinoline in 100 yard bolts, construction, widths, and lengths of bandage rolls and bandages, construction and length of package goods.

U. S. Gov., Federal Specifications Board. 289: 1925. Plain Gauze. For 6 grades, requirements on freedom from loading, percentage of water extract, of alcohol extract, of ether extract, of ash, neutrality and purity of water extract, permissible decrease in strength on sterilization, absorption test, thread count, and weight for each grade, methods of test.

References.—Tolerances, methods of testing, definitions. *See also* 300.4, 300.6. Gauze bandages, gauze dressings. *See* 398.31, 398.34.

398.22 Sublimated Gauze

398.23 Iodoform Gauze

398.3 SURGICAL DRESSINGS

398.31 Bandages

U. S. Gov., Dept. of Commerce. Bureau of Standards. R86–28; 1928. Surgical Gauze. Simplified practice recommended and accepted by industry establishing a limited number of stock sizes and varieties, covering construction, widths, and lengths of bandage rolls and bandages, construction and length of package goods, widths and construction of surgical gauze.

U. S. Gov., Federal Specifications Board. DDD-B-51; 1931. Compressed Gauze Bandage. Requirements on dimensions of material and dimensions of rolled and compressed bandage, method of packing, gauze to conform to requirements for type A given in F. S. B. spec. 289 for plain gauze.

U. S. Gov., Federal Specifications Board. DDD-B-61; 1931. Plain Gauze Roller Bandages. For 8 sizes, requirements on widths and lengths, rolling and freedom from loose ends, gauze to conform to requirements for type I given in F. S. B. spec. 289 for plain gauze.

U. S. Gov., Federal Specifications Board. 300; 1925. Plaster of Paris Bandage. For 3 sizes, requirements on dimensions, general quality and time of setting of plaster of paris, weight of plaster per bandage, packing, gauze used to meet requirements of type A given in F. S. B. spec. 289 for plain gauze.

References.—Gauze, surgical dressings. *See also* 398.21, 398.34. Rubber bandages, adhesive plaster. *See* 204.11, 204.12.

398.32 Compresses

398.33 Surgical Tape

References.—Adhesive tape. *See* 204.12.

398.34 Gauze Dressings, Pads, Etc.

American College of Surgeons. Manual of Surgical Dressings; 1930. Proposed standard dressings, including grade of material used, size of cutting, number of and size of folds, for various sizes of sponges (dressings for sponging or wiping), abdominal packs for walling off, sterile gauze dressings for covering incisions after operation, and pads to absorb drainage after operation.

References.—Gauze, bandages. *See* 398.21, 398.31.

399. MISCELLANEOUS TEXTILE MANUFACTURES

399.1 BRASSARDS

399.2 CLOTH BUCKETS AND BASINS

399.3 CASES OF CLOTH

399.4 SLINGS

399.5 CUSHIONS AND COVERS

References.—Rubber cushions. *See* 204.25.

399.6 HOSE

References.—Rubber, linen, and cotton hose. *See* 202.

399.7 WICKS

American Society for Testing Methods. D 219–30; 1930. Approved by American Standards Assn. as Z11s—1930. Method of Test for Burning Quality of Long Time Burning Oil for Railway Use. Includes requirements on construction and dimensions of felt wick for Am. Rwy. Assn. standard semaphore lamp.

399.8 TYPEWRITER RIBBONS

References.—Typewriter, hectograph, and other machine ribbons. *See* 932.2.

399.9 TEXTILE PRODUCTS NOT ELSEWHERE CLASSIFIED

American Marine Standards Committee. O No. 27—1930. Uniforms for Merchant Marine Officers. Gold and silver lace. For gold or silver thread lace and for gold or silver wire lace, requirements on construction, weight of gold or silver metal per yard, assay of gold strip or wire, standard widths of strips.

References.—Asbestos textiles, yarns and packing. *See* 545.4.

400–499 WOOD AND PAPER

400–409 LUMBER (LOGS, TIMBER, AND OTHER UNMANUFACTURED OR PARTLY MANUFACTURED WOOD)

400.0 LUMBER STANDARDIZATION

American Railway Engineering Assn. 1929 Manual. Wooden Bridges and Trestles. Classification and grades of softwood lumber in conformity with Am. Lumber Standards in general with slight variations therefrom in definitions of maximum defects and blemishes.

U. S. Gov., Dept. of Commerce. Bureau of Standards. Simplified Practice Recommend. R16–29; 1929. Lumber. American Lumber Standards for softwood lumber. Standards set up and recommended by industry covering classification of lumber, nomenclature, basic grade definitions, seasoning standards, standard sizes, uniform workings, description, measurement, tally, shipping provisions, grade marking, and inspection of lumber.

400.1 PHYSICAL ANALYSIS OF LUMBER

400.12 Properties and Uses of Lumber

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. For structural timber for highway bridges, permissible unit stresses for select and common grades for use with computed stresses which contain no allowance for live load impacts.

American Railway Engineering Assn. Proc. for 1929, vol. 30, p. 1206. Wooden Bridges and Trestles. For structural timber, relation of strength of dry timber to that of timber not continuously dry, basis for determination of allowable stresses for structural grades of Am. Lumber Standards, basic working stresses for clear wood of various species of structural sizes, charts for computing strengths.

400.13 Tests of Lumber

American Society for Testing Materials. D143–27; 1927. Methods of Testing Small Clear Specimens of Timber. Approved by American Standards Assn. as O4a–1927. Selection, preparation, and storage of test specimens, test procedure for static and impact bending, tension, compression, hardness, shear, cleavage, specific gravity, shrinkage, and moisture content.

American Society for Testing Materials. D 198–27; 1927. Methods of Conducting Static Tests of Timbers in Structural Sizes. Approved by American Standards Assn. as O4b—1927. Number and sizes of test specimens, methods for major tests of member proper for bending and compression, for minor tests for static bending, compression, hardness, shear, and moisture content.

400.14 Inspection of Lumber

National Engineering Inspection Assn. Tentative Methods of Procedure for Inspection of Materials; 1930. Includes for timber, piles, poles, and ties, general procedure including checking of order, inspection before treatment, inspection of treating process, inspection after treatment, loading, and reports.

U. S. Gov., Dept. of Commerce. Bureau of Standards. Simplified Practice Recom. R16–29; 1929. Lumber. Includes regulations on who may obtain inspection, reinspection on complaint, etc., the formulation of regulations for inspection and the administration of inspection service to be conducted by the lumber industry through its trade associations and not by Government.

400.2 SOFTWOOD GRADING RULES

400.20 General Items

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules applicable to export trade only, for domestic trade the grading rules of West Coast Lumbermens Assn. are used.

U. S. Gov., Dept. of Commerce. Bureau of Standards. Simplified Practice. Recom. R16–29; 1929. Lumber. American Lumber Standards for softwood lumber. Standards set up and recommended by industry covering basic grade definitions for yard lumber, structural material, factory and shop lumber, definitions of defects and blemishes, basic definitions of select and common grades, standard sizes, seasoning, etc.

400.21 Cedar Grading Rules

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Thin Lumber, and Plywood; 1931. Aromatic Red Cedar. For one select grade and 3 common grades, definitions of grades with permissible defects, dimensions, and percentages of sizes of the minimum dimensions.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Cedar grading rules applicable to export trade only, for domestic trade the grading rules of West Coast Lumbermens Assn. are used.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. For western red cedar, definitions of quality grades, allowable defects, size standards and dressed dimensions, for yard, factory, shop, and box lumber, definitions of defects, in conformity with American Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, and Idaho White Pine; 1929. Includes grading rules for cedar, definitions of select and common grades of yard lumber and of grades for timbers, permissible defects, standard sizes. In conformity with Am. Lumber Standards with a few exceptions on sizes.

References.—Am. Lumber Standards, nomenclature and basic grading rules. *See* 400.0, 400.20.

400.22 Cypress Grading Rules

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Cypress. For factory lumber, definitions of 6 grades, including standard thicknesses, width and length limits, permissible defects, sapwood, etc., includes tank and boat stock and box stock.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Cypress.

For yard lumber, definitions of 5 grades of finish lumber and of 5 grades of common lumber, including standard thicknesses, width and length limits, permissible defects, sapwood, etc.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Grading rules for yard lumber, factory lumber, timber and railroad material of red cypress (coastal type), in conformity with American Lumber Standards except for the clear heart finish grade in the select, and peck grade in the common grade of yard lumber.

References.—Am. Lumber Standards, nomenclature and basic grading rules. *See* 400.0, 400.20.

400.23 Fir Grading Rules

Douglas Fir Plywood Institute. Douglas Fir Plywood Grading Rules; 1928. Application and uses of four grades, with grade names, no very definite quality requirements for the grades.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Fir grading rules applicable to export trade only, for domestic trade the grading rules of West Coast Lumbermens Assn. are used.

West Coast Lumbermens Assn. Grading and Dressing Rules Douglas Fir, Sitka Spruce, West Coast Hemlock, Western Red Cedar Lumber; 1929. For Douglas fir, definitions of quality grades, allowable defects, size standards and dressed dimensions, for yard lumber and structural timbers, and for shop lumber, definitions of defects, in conformity with American Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, and Idaho White Pine; 1929. Includes grading rules for Douglas fir and white fir, definitions of select and common grades, permissible defects, standard sizes. In conformity with Am. Lumber Standards with a few exceptions on sizes.

References.—Am. Lumber Standards, nomenclature and basic grading rules. *See* 400.0, 400.20.

400.24 Hemlock Grading Rules

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Grading rules for yard lumber including definitions of defects and permissible defects for various grades of different varieties of yard lumber, to conform to American Lumber Standards as to grade and standard sizes.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Hemlock grading rules applicable to export trade only, for domestic trade the grading rules of West Coast Lumbermens Assn. are used.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. For west coast hemlock, definitions of quality grades, allowable defects, size standards and dressed dimensions, for yard lumber, factory, box and car lumber, definitions of defects, in conformity with American Lumber Standards.

References.—Am. Lumber Standards, nomenclature and basic grading rules. *See* 400.0, 400.20.

400.25 Larch and Tamarack Grading Rules

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Grading rules for yard lumber including definitions of defects and permissible defects for various grades of different varieties of yard lumber, to conform to American Lumber standards as to grade and standard sizes.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, and Idaho White Pine; 1929. Includes grading rules for larch, definitions of 2 select and 5 common grades, permissible defects, standard sizes. In conformity with Am. Lumber Standards with a few exceptions on sizes.

References.—Am. Lumber Standards, nomenclature and basic grading rules. *See* 400.0, 400.20.

400.26 Pine Grading Rules

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes grading rules for soft pine conforming to American Lumber Standards for yard lumber, includes moisture content requirements.

Southern Pine Assn. Grades of Dense Longleaf and Shortleaf Southern Yellow Pine Timbers; 1927. Definitions of quality grades of structural timbers, structural joists and plank, and utility timbers, with definition of dense southern pine in accordance with American Lumber Standards, definitions of defects.

Southern Pine Assn. Grades of Longleaf and Shortleaf Southern Pine Lumber; 1929. Definitions of quality grades of southern pine yard lumber, standard sizes and dressed dimensions, moisture content requirements, definitions of defects, standard patterns, in conformity with American Lumber Standards.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Definitions of export grades of pitch pine covering flooring, boards and planks, deals, decking, scantling, dimension, kiln and air dried saps, definitions of defects.

Southern Pine Assn. Southern Yellow Pine Bridge and Trestle Timbers for Railway Structures; 1917. For stringers, caps, sills, posts, struts, girts, braces, ties and guard rails, definitions of quality grades, definitions of defects.

Southern Pine Assn. Southern Yellow Pine Car Material; 1919. Definitions of quality grades for car siding, lining, roofing, and flooring, and for car sills and flooring, definitions of defects.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, and Idaho White Pine; 1929. Definitions of select and common grades, permissible defects, standard lengths and sizes. In conformity with Am. Lumber Standards except for inclusion of a 11/16 size for finish, boards, etc. and a greater lap in shiplap.

White Pine Assn. of the Tonawandas. Grades of Northern White Pine Lumber as Made in the Tonawandas; 1922. Definitions of quality grades of yard lumber suitable for interior trim, pattern stock, door, and sash, etc., also grades of mouldings, shelving, barn lumber, and box lumber, permissible defects in each grade.

References.—Am. Lumber Standards, nomenclature, and basic grading rules. *See* 400.0, 400.20.

400.27 Redwood Grading Rules

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Conforms to American Lumber Standards, definitions of standard defects, standard dimensions of dressed sizes and rough dry sizes of yard lumber, definitions of grades of yard lumber and of shop or pattern lumber as regards amount of heart wood, permissible defects, etc., additional C. R. A. grades of clear heart lumber.

California Redwood Assn. Structural Grades of California Redwood; 1928. For two grades of all-heart structural timber, permissible defects, permissible variations from nominal dimensions.

California Redwood Assn. Western Grades, Uppers, Sundry Commons, Shop; 1929. Permissible off-dimension allowance for rough and for finished lumber, definitions of grades dependent on percentage heart, allowable defects.

References.—Am. Lumber Standards, nomenclature, and basic grading rules. *See* 400.0, 400.20.

400.28 Spruce Grading Rules

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Spruce grading rules applicable to export trade only, for domestic trade the grading rules of West Coast Lumbermens Assn. are used.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. For sitka spruce, definitions of quality grades, allowable defects, size standards and dressed dimensions, for yard lumber, factory and box lumber, definitions of defects, in conformity with American Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, and Idaho White Pine; 1929. Includes grading rules for spruce, definitions of select and common grades, permissible defects, standard sizes. In conformity with Am. Lumber Standards with a few exceptions on sizes.

References.—Am. Lumber Standards, nomenclature, basic grading rules. *See* 400.0, 400.20.

400.3 HARDWOOD GRADING RULES

400.30 General Items

U. S. Gov., Federal Specifications Board. 24; 1922. Lumber. For softwood lumber see F. S. B. spec. 533a. Hardwood lumber specifications to be in accordance with grading rules of National Hardwood Lumber Assn.

400.31 Basswood Grading Rules

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Basswood. Definitions of 6 grades, width and length limits, permissible kinds and amounts of defects, side bend, etc.

400.32 Birch Grading Rules

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Birch. Definitions of 7 grades, width and length limits, permissible kinds and amounts of defects, side bend, etc.

400.33 Gum Grading Rules

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Black Gum, Quartered Sap Gum, Quartered Black Gum, Plain and Quartered Red Gum. Definitions of 5 and 6 classes of each, width and length limits, permissible kinds and amounts of defects, sapwood, etc.

400.34 Hickory Grading Rules

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Hickory. Definitions of 5 grades, width and length limits, permissible kinds and amounts of defects, bird pecks, side bend, etc.

400.35 Mahogany Grading Rules

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Cuban and San Domingo Mahogany. Definitions of 8 grades, width and length limits, permissible kinds and amounts of defects, worm holes, short grades, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Mexican and African Mahogany. Definitions of 14 grades, width and length limits, permissible kinds and amounts of defects, pin worm holes, short grades, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Philippine Mahogany. Definitions of 12 grades, width and length limits, permissible kinds and amounts of defects, needle worm holes, etc.

400.36 Maple Grading Rules

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Hard and Soft Maple. Definitions of 7 grades of hard maple and 6 grades of soft maple, width and length limits, permissible kinds and amounts of defects, side bend, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. White Maple. For firsts, seconds, and No. 1 common, definitions of grade, required portions showing white, width and length limits, permissible defects, etc.

400.37 Oak Grading Rules

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Bending Oak. Including red and white oak, firsts, seconds, and No. 1 common, definitions of grade, width and length limits, permissible defects, worm holes, stain, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Plain and Quartered Red and White Oak. Definitions of 7 grades, width and length limits, permissible kinds and amounts of defects, sapwood, side bend, etc.

400.38 Walnut Grading Rules

American Walnut Manufacturers' Assn. and National Hardwood Lumber Assn. Rules for the Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Thin Lumber and Plywood; 1931. Published by N. H. L. A. Definitions of standard defects and of 6 grades of walnut lumber, giving width and length limitations, permissible kinds and amount of defects.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Walnut. Definitions of 6 grades, width and length limits, permissible kinds and amounts of defects, sapwood, etc.

400.39 Grading Rules for Other Hardwoods

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Ash, Beech, Hackberry, Red Alder, Sycamore, Soft Elm, Buckeye, Chestnut, Poplar, Rock Elm, Pecan, Cottonwood, Tupelo, Magnolia, Willow, Aspen, Cherry, and Butternut. Definitions of 5 to 7 grades of each, width and length limits, permissible kinds and amounts of defects, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Quartered Poplar. For firsts, seconds and No. 1 common, definitions of grade, width and length limits, permissible defects, etc.

400.4 PRESERVATIVE TREATMENT FOR WOOD

400.40 Definitions and Standards Relating to Wood Preservation

American Railway Engineering Assn. 1929 Manual. Wood Preservation; 1926. General requirements, preparation and handling of wood before treatment as regards grouping, stacking, seasoning, adzing, boring, and framing, care of wood after treatment.

American Wood Preservers' Assn. 2c; 1929. Standards for the Purchase and Preservation of Treatable Timber. Requirements on quality of wood, peeling, seasoning before treatment, stacking, framing, recommended type of treating process and amount of treatment.

400.41 Preservative Solutions for Wood

References.—Creosote, zinc chloride. *See* 801.3, 839.38.

400.42 Pressure Process of Wood Preservation

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Preservative Treatments for Timber. Requirements on pressures and time of application for steam seasoning of southern yellow pine and for oil seasoning for douglas fir, preparation of timber for treatment, required penetration and quantity of preservative retained for piling and large timbers, temperatures, pressures, periods of treatment, and procedure for full cell process, empty cell process with initial air, and empty cell process without initial air for oil treatment of southern yellow pine, and for zinc chloride treatment of southern yellow pine, and for full cell and empty cell process for Douglas fir.

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Preservative Treatment for Creosoted Wood Blocks. Requirements on temperatures, pressures, and time interval for each step in treatment procedure for initial steam, vacuum, preservative added with pressure, final vacuum, and final content of preservative for treatment of southern yellow pine, tamarack, norway pine, and douglas fir blocks.

American Electric Railway Engr. Assn. Recommended Specification. WP104–29; 1929. Preservative Treatment of Wood by Pressure Process. Requirements on seasoning, procedure for impregnation with creosote oil by full cell process, with zinc chloride and creosote oil by full cell process, with creosote oil by empty cell process with final vacuum, with creosote oil by empty cell process with initial air and final vacuum.

American Electric Railway Engr. Assn. Recommended Specification. WP105–29; 1929. Pressure Treatment of Pine Poles. Requirements on preparation and seasoning of poles, required absorption and penetration and treatment procedure for full cell or Bethel process, empty cell with initial air pressure, and empty cell with final vacuum.

American Railway Assn. Signal Section. 14026; 1926. Preservative Treatment of Capping and Grooved Trunking. Preservative to be creosote of A. R. E. A. Grade 1, treatment procedure by empty cell process with initial air, required final retention of preservative.

American Railway Assn. Telegraph and Telephone Section. 1–A–25; 1928. Pressure Treatment of Pine Poles. Creosote according to A. R. E. A. specification, preparation of poles for treatment, requirements for seasoning, treatment procedure for full cell and empty cell processes, amount of preservative retained and methods of determining penetration.

American Railway Assn., Telegraph and Telephone Section. 1–A–10; 1928. Creosoted Timber Other Than Poles Used In The Telegraph and Telephone Plant. Includes conduit, crossarms, planks and other timber. Creosote according to A. R. E. A. specifications, preparation of timber, requirements on treatment procedure, temperatures and pressures, for full cell process, and for empty cell process, requirements on penetration and amount of preservative retained.

American Railway Engineering Assn. 1929 Manual. Wood Preservation. Preservative Treatment of Douglas Fir; 1926. Amount of creosote or zinc chloride preservative to be absorbed under different types of treatment for ties, piling, and structural timbers, minimum sapwood and penetration for piling, treatment requirements for Douglas fir with full cell, Rueping, Lowry, and zinc chloride processes.

American Railway Engineering Assn. 1929 Manual. Wood Preservation. Treating Processes; 1927. For creosote (full cell process), creosote-Lowry process (empty cell with final vacuum), creosote-Rueping (empty cell with initial air and final vacuum), zinc chloride, zinc chloride and creosote-card process, and the zinc-tannin processes, requirements for seasoning of wood, kind and amount of preservative to be retained, depth of treatment, temperatures, pressures, and vacuum requirements during process, and steps in process of treatment.

American Society of Municipal Engineers. Creosoted Wood Block Paving; 1921. Preservative treatment procedure, times, temperatures, and pressures, requirements on retention of preservative, for coal tar preservative oils.

American Society for Testing Materials. D 52–20; 1920. Wooden Paving Blocks for Exposed Pavements. Includes procedure for pressure treatment of paving blocks, pressures, temperatures, time of treating, treatment procedure.

American Wood Preservers' Assn. 3b; 1931. Definition of Creosote. Definition of Tar. Defines in general terms, three classes of tars.

American Wood Preserver's Assn. 12a; 1921 Definitions of Processes. Exposition of various processes and modifications, dates when patented and name of patentee, for pressure process, full cell and empty cell methods for creosote and for zinc chloride, brush and open tank treatments.

American Wood Preserver's Assn. 16b; 1923. Creosoted Wood Block Street Paving. Includes treatment requirements for wood paving blocks of southern yellow pine, douglas fir, tamarack, or norway pine, temperatures, pressures, treatment procedure and required retention of preservative, using coal tar oils.

American Wood Preserver's Assn. 20a; 1921. Method for Determining Zinc Chloride Penetration by Color Reaction Test with Iodine-Potassium Ferricyanide-Starch. Preparation of solution, test procedure by spraying a disc of the wood.

American Wood Preserver's Assn. 23a; 1922. Method of Calculating Volumetric Absorption of Zinc Chloride Solutions. Refers to percentage of volumetric absorption in treated timber.

American Wood Preserver's Assn. 28a; 1923. Visual Method of Determining Sodium Fluoride Penetration in Treated Wood. Solutions required, test by spraying disc of the treated wood with solution.

American Wood Preserver's Assn. 33b; 1926. Instructions for the Inspection of Preservative Treatment of Wood. Applicable to full cell processes for oil, salt, and oil-salt treatments, and to empty cell processes for oil treatment.

American Wood Preserver's Assn. 34b; 1926. Preservative Treatment of Ties by Pressure Processes. Not applicable to douglas fir, larch or tamarack. Seasoning and preparation of ties for treatment, treating operation including required temperatures, pressures, and times, for oil, salt, and oil-salt treatments, for full cell and empty cell processes. Retention specified by contract.

American Wood Preserver's Assn. 35c; 1929. Preservative Treatment of Timber and Lumber by Pressure Processes. Not applicable to douglas fir, larch or tamarack, requirements for seasoning and preparation of material for treatment, treating procedures including required temperatures, pressures and times for full and empty cell process of oil treatment, for salt treatment and oil-salt treatment. Retention of preservative specified by contract.

American Wood Preserver's Assn. 36b; 1926. Preservative Treatment of Poles by Pressure Processes. Not applicable to Douglas fir, larch, or tamarack. Seasoning and preparation of material for treatment, requirements on treating procedure, temperatures, pressures, and times for full cell and empty cell processes. Retention of preservative specified by contract.

American Wood Preserver's Assn. 37b; 1926. Preservative Treatment of Posts by Pressure Processes. Requirements for seasoning and preparation of material, procedure in treating. required temperatures, pressures, and times for full cell and empty cell processes using creosote. Amount of preservative retained to be specified in contract.

American Wood Preserver's Assn. 38a; 1926. Preservative Treatment of Douglas Fir Ties by Pressure Process. Seasoning and preparation for treatment, treating procedure including required temperatures, pressures, and times for full cell and empty cell process for oil treatment, for salt treatment, and for oil-salt treatment. Retention of preservative as specified by contract.

American Wood Preserver's Assn. 39a; 1926. Preservative Treatment of Yellow Pine Piles by Pressure Processes. Seasoning and preparation for treatment, treating procedure including required temperatures, pressures, and times for creosote treatment by full cell and by empty cell process. Retention of preservative as specified by contract.

American Wood Preserver's Assn. 41a; 1926. Preservative Treatment of Douglas Fir Piles by Pressure Processes. Seasoning and preparation for treatment, treating procedure, including required temperatures, pressures, and times for creosote treatments by full cell and empty cell processes. Retention of preservatives as specified by contract.

American Wood Preserver's Assn. 42a; 1928. Preservative Treatment of Trunking and Capping by Pressure Processes. Not applicable to Douglas fir, larch or tamarack. Seasoning and preparation for treatment, treating procedure including required temperatures, pressures, and times for creosote treatment by full cell and empty cell processes. Retention of preservative according to contract.

American Wood Preserver's Assn. 45a; 1928. Preservative Treatment of Douglas Fir Lumber by Pressure Processes. Includes sawed timbers, seasoning and preparation for treatment, treatment procedure including required temperatures, pressures, and times for creosote treatment by full cell and by empty cell processes. Retention of preservative as specified by contract.

U. S. Gov., Federal Specifications Board. TT–W–571; 1931. Wood Preservatives and Processes of Treatment. The specifications of the American Wood Preserver's Assn. for preservatives and methods of treatment have been adopted by F. S. B. for treatment of ties, piling, poles, posts, and structural timbers. A schedule of recommended practice for the preservative treatment of the various forms of timber is included in this specification.

References.—Lumber suitable for treatment. *See* 404.0. Definitions, preparatory treatment of wood. *See* 400.40. Creosote, zinc chloride. *See* 801.3, 839.38.

400.43 Brush and Open Tank Treatment for Wood Preservation

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Preservative Treatments for Timber. For open-tank treatment requirements as regards equipment, temperature of bath, time of immersion, and procedure for hot bath treatment, for ordinary and heavy hot and cold bath treatment, temperatures and procedures for brush treatment and for spray treatment.

American Electric Railway Engr. Assn. Recommended Specification WP106–30; 1930. Nonpressure Treatment for Structural Timber and Ties. For open-tank treatment, requirements on preparation, time of immersion, procedure for single or hot bath treatment, for hot and cold treatment, empty cell, and for hot and cold treatment, full cell. For brush and for spray treatments, procedure and temperatures of preservative.

American Electric Railway Engr. Assn. Recommended Specification WP107–29; 1929. Brush Treatment of Wood Poles. Requirements on types of preservative, temperature of preservative, methods of treatment for new poles before installation, treatment of wood poles in place and of wood poles that have been removed from ground and in various stages of decay.

American Electric Railway Engr. Assn. WP125–30; 1930. Open Tank Butt Treatment of Poles, Plain and Incised. Requirements on seasoning, preparation, types and temperature of preservative, length of treated section, treatment procedure, amount and depth of incisions for incised poles.

American Railway Assn., Telegraph and Telephone Section 1–A–7; 1925. Butt Treatment of Cedar Poles in Open Tanks. Preparation of poles for treatment, creosote according to A. R. A. specifications, classification of poles for treatment, required depth of penetration and method of testing.

American Railway Assn., Telegraph and Telephone Section 1–A–19; 1927. Butt Treatment of Chestnut Poles. Treatment by alternate hot and cold bath open-tank method, creosote according to A. R. E. A. specifications, classification of poles, preparation for treatment, duration of each treatment for each class of poles, length of section to be treated.

American Wood Preservers Assn. 12a; 1921. Definitions of Processes. Includes definitions of brush and open-tank treatments.

American Wood Preserver's Assn. 43a; 1928. Preservative Treatment of Pole Butts by Nonpressure Process—Incising Method. Preparation of material, height of treatment, treating procedure for creosote oil treatment.

American Wood Preserver's Assn. 44a; 1928. Preservative Treatment of Pole Butts by Nonpressure Process—Nonincising Method. Preparation of material for treatment, height of treatment, treating procedure for tank process for creosote oil.

U. S. Gov., Federal Specifications Board. TT–W–571; 1931. Wood Preservatives and Processes of Treatment. The specifications of the American Wood Preservers Assn. for preservatives and methods of treatment have been adopted by F. S. B. for treatment of ties, piling, poles, posts, and structural timbers. A schedule of recommended practice for the preservative treatment of the various forms of timber is included in this specification.

Western Red Cedar Assn. Butt Treating Cedar Poles in Open Tanks; 1930. For 3 methods of treatment in creosote, a continuous submersion in hot creosote for 15 minutes, a process using alternately submersion in hot and cold creosote for 6 hours, and a guaranteed penetration treatment, procedure and temperature of preservative for each method, creosote according to Am. Wood Preservers Assn. specifications.

References.—Definitions, preparatory treatment of wood. *See* 400.40. Creosote, zinc chloride. *See* 801.3, 839.38.

400.49 Miscellaneous Specifications for Wood Preservative Treatment

Railway Fire Protection Assn. Handbook. 1925. Timber Treating Plants, Fire Prevention and Protection. Recommendations on relative location of storage tanks, treating cylinders, boilers, etc., their enclosure, lighting, and location of valves, types of fire protection, water lines, hydrants, fire extinguishers, smother jets, water barrels and pails recommended.

400.5 WOOD PULP

400.50 General Items

American Paper and Pulp Assn. Assn. of American Wood Pulp Importers. Technical Assn. of the Pulp and Paper Industry. Rules for Weighing, Sampling, and Testing Wood Pulp for Moisture; 1930. Rules for sampling at pulp mill by strip method and rules for sampling on dock or at receiving point by boring, strip or wedge methods, getting wet weight, drying, calculating dry weight, moisture testing of baled pulp.

National Assn. of Waste Material Dealers (Inc.). Official Rules for Weighing, Sampling, and Testing Wood Pulp; 1926. Methods for determination of wet weight, sampling at pulp mill, on dock, or at receiving point.

Technical Assn. of Pulp and Paper Industry. Proposed Standard Test Conditions for Determining the Initial Strength of Pulp; 1927. Requirements on preparation of pulp, making of test sheet, pressing and drying, atmospheric conditions during testing of sheets.

401. RAW AND HEWN TIMBERS

401.1 RAILROAD TIES

401.10 General Items

American Mining Congress. Committee Report on Mine Timbering; 1923. Includes recommended kinds and sizes of timber for general timbering, method of timbering in roadways, and sizes of ties for steel rails.

American Railway Engineering Assn. and U. S. Forest Service. Sponsors. Approved by American Standards Assn. as O 3–1926. Railroad Ties. Published by National Assn. of Railroad Tie Producers. For cross ties and switch ties, acceptable kinds of wood, requirements on general qualities, resistance to wear, dimensions of standard sizes, permissible defects, classification into groups which may be used untreated and groups which require treatment.

National Hardwood Lumber Assn. Switch Ties and Cross Ties. Specifications of American Standards Assn. adopted.

401.11 Cedar Ties

American Electric Railway Engr. Assn. W26–26 and W27–26; 1926. Cross Ties, Switch Ties. Specifications same as those of Am. Rwy. Engr. Assn. Includes requirements for cedar ties. *See* 401.10.

American Railway Engineering Assn. 1929 Manual. Cross Ties. Switch Ties. Includes requirements for cedar ties. *See* 401.10.

National Assn. of Railroad Tie Producers. Cross Ties and Switch Ties; 1926. Same as specifications of American Railway Engineering Assn. Includes cedar ties. *See* 401.10.

Northern White Cedar Assn. Manufacture and Grading of Northern White Cedar Products; 1923. Standard Ties. For sawed or hewn ties, limiting dimensions, permissible defect, definitions of 2 classes dependent on size.

References.—Preservative treatment. *See* 400.42.

401.12 Chestnut Ties

American Electric Railway Engr. Assn. W26–26 and W27–26; 1926. Cross Ties, Switch Ties. Specifications same as those of Am. Rwy. Engr. Assn. Includes requirements for chestnut ties. *See* 401.10.

American Railway Engineering Assn. 1929 Manual. Cross Ties. Switch Ties; 1926. Includes requirements for chestnut ties. *See* 401.10.

National Assn. of Railroad Tie Producers. Cross Ties and Switch Ties; 1926. Same as specifications of American Railway Engineering Assn. for chestnut ties. *See* 401.10.

References.—Preservative treatment. *See* 400.42.

401.13 Cypress Ties

American Electric Railway Engr. Assn. W26–26 and W27–26; 1926. Cross Ties, Switch Ties. Specifications for cypress ties the same as those of Am. Rwy. Engr. Assn. *See* 401.10.

American Railway Engineering Assn. 1929 Manual. Cross Ties. Switch Ties. Includes requirements for cypress ties. *See* 401.10.

National Assn. of Railroad Tie Producers. Cross Ties and Switch Ties; 1926. Same as specifications of American Railway Engineering Assn. for cypress ties. *See* 401.10.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Switch Ties. Cross Ties. For 1 grade of switch ties and 1 grade of peck cross ties, requirements on non-permitted defects and permissible peck.

References.—Preservative treatment. *See* 400.42.

401.14 Fir Ties

American Electric Railway Engineering Assn. W26–26 and W27–26; 1926. Cross Ties, Switch Ties. Specifications for fir ties are same as those of Am. Rwy. Engr. Assn. *See* 401.10.

American Railway Engineering Assn. 1929 Manual. Cross Ties. Switch Ties. Includes requirements for fir ties. *See* 401.10.

National Assn. of Railroad Tie Producers. Cross Ties and Switch Ties; 1926. Same as specifications of American Railway Engineering Assn. for fir ties. *See* 401.10.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic

Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for fir ties applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Ties. For fir ties, definitions of 3 quality grades, permissible defects, permissible variations in size and length.

References.—Preservative treatment. *See* 400.42.

401.15 Oak Ties

American Electric Railway Engr. Assn. W26–26 and W27–26; 1926. Cross Ties, Switch Ties. Specifications for oak ties are same as those of Am. Rwy. Engr. Assn. *See* 401.10.

American Railway Engineering Assn. 1929 Manual. Cross Ties. Switch Ties; 1926. Includes requirements for oak ties. *See* 401.10.

National Assn. of Railroad Tie Producers. Cross Ties and Switch Ties; 1926. Same as specifications of American Railway Engineering Assn. for oak ties. *See* 401.10.

References.—Preservative treatment. *See* 400.42.

401.16 Pine Ties

American Electric Railway Engr. Assn. W26–26 and W27–26; 1926. Cross Ties, Switch Ties. Specifications for pine ties are same as those of Am. Rwy. Engr. Assn. *See* 401.10.

American Railway Engineering Assn. 1929 Manual. Cross Ties. Switch Ties; 1926. Includes requirements for pine ties. *See* 401.10.

National Assn. of Railroad Tie Producers. Cross Ties and Switch Ties; 1926. Same as specifications of American Railway Engineering Assn. for pine ties. *See* 401.10.

References.—Preservative treatment. *See* 400.42.

401.17 Redwood Ties

American Electric Railway Engr. Assn. W26–26 and W27–26; 1926. Cross Ties, Switch Ties. Specifications for redwood ties are same as those of Am. Rwy. Engr. Assn. *See* 401.10.

American Railway Engineering Assn. 1929 Manual. Cross Ties. Switch Ties; 1926. Includes requirements for redwood ties. *See* 401.10.

National Assn. of Railroad Tie Producers. Cross Ties and Switch Ties; 1926. Same as specifications of American Railway Engineering Assn. for redwood ties. *See* 401.10.

References.—Preservative treatment. *See* 400.42.

401.18 Walnut Ties

American Electric Railway Engr. Assn. W26–26 and W27–26; 1926. Cross Ties, Switch Ties. Specifications for walnut ties are the same as those of Am. Rwy. Engr. Assn. *See* 401.10.

American Railway Engineering Assn. 1929 Manual. Cross Ties, Switch Ties; 1926. Includes requirements for walnut ties. *See* 401.10.

National Assn. of Railroad Tie Producers. Cross Ties and Switch Ties; 1926. Same as those of American Railway Engineering Assn. for walnut ties. *See* 401.10.

References.—Preservative treatment. *See* 400.42.

401.2 POSTS

401.21 Cedar Posts

American Railway Engineering Assn. 1929 Manual. Standard Right-of-Way Fences; 1926. Includes cedar fence posts, minimum dimensions and depth of setting, general quality.

Northern White Cedar Assn. Manufacture and Grading of Northern White Cedar Posts; 1927. For posts cut from live timber, round or sawed, requirements on peeling and trimming, minimum top sizes, permissible defects such as knots, twist, rot, crook, etc.

Western Red Cedar Assn. Western Red Cedar Posts; 1929. For split and round posts, standard sizes, minimum small end sizes, shapes for split posts, permissible defects.

References.—Preservative treatment. *See* 400.42.

401.22 Chestnut Posts

American Railway Engineering Assn. 1929 Manual. Standard Right-of-Way Fences; 1926. Includes chestnut fence posts, minimum dimensions and depth of setting, general quality.

References.—Preservative treatment. *See* 400.42.

401.23 Cypress Posts

401.24 Locust Posts

American Railway Engineering Assn. 1929 Manual. Standard Right of Way Fences; 1926. Includes locust fence posts, minimum dimensions and depth of setting, general quality.

References.—Preservative treatment. *See* 400.42.

401.25 Oak Posts

American Railway Engineering Assn. 1929 Manual. Standard Right of Way Fences; 1926. Includes white oak fence posts, minimum dimensions and depth of setting for end and intermediate posts, and general quality.

References.—Preservative treatment. *See* 400.42.

401.26 Pine Posts

401.29 Miscellaneous Specifications for Posts

American Railway Engineering Assn. 1929 Manual. Standard Right-of-Way Fences; 1926. Includes wood fence posts and braces, of cedar, locust, chestnut, bois d'arc, white oak, mulberry, catalpa, minimum dimensions and depth of setting for intermediate and end posts, general quality.

California Redwood Assn. Structural Grades of California Redwood; 1928. For two grades of all-heart lumber for caps, posts, rail posts, etc., permissible defects, permissible variations from nominal dimensions of rough and dressed lumber.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Wood Guard Rail. For wood posts for guard rail, requirements on grade of lumber for sawed posts as defined by Am. Lumber Standards, West Coast Lumbermens Assn., or Southern Pine Assn., preparation and general quality of round posts, painting and preservative treatments.

References.—Preservative treatment. *See* 400.42.

401.3 POLES, HEWN AND SAWN

401.30 General Items

American Railway Assn., Electrical Section. VI–a–23; 1923. Electric Light, Power Supply and Trolley Lines Crossing Railways. Wood Poles. For wood poles at crossings, requirements on general quality, minimum top diameter, depth of setting for various pole lengths, allowable unit stresses.

American Railway Assn., Electrical Section. VI–b–25; 1925. Construction of Overhead Electric Supply Lines for Railroad Use on Railroad Property. Wood Poles Permissible minimum top diameter, requirements on depth of setting for various lengths of pole, allowable unit stresses for various species of wood and for 2 types of construction.

American Standards Assn., Telephone Group. 05a–1930. Ultimate Fiber Stresses of Wood Poles. Standard fiber stresses to be allowed in designing pole lines for northern white cedar, western red cedar, chestnut, and creosoted southern yellow pine poles.

American Wood Preserver's Assn. 14b; 1926. Standard Volumes of Piles and Poles. Table of volumes per foot of length for various diameters of small and large ends.

401.31 Cedar Poles

American Electric Railway Engr. Assn. D8–26; 1926. Wood Poles. For western red cedar poles, and for eastern white cedar poles, requirements on general quality. minimum diameters of poles of various lengths for 3 classes of poles used in trolley and combination trolley and auxiliary line construction.

American Standards Assn., Telephone Group. O5b1–1931 and O5b2–1931. White Cedar Poles. Tentative standard for quality covering requirements on prohibited and permissible kinds and amounts of defects, permissible grain twist, pole sweep, length tolerance, peeling, sawing ends, trimming. Standard dimensions for poles from 16 to 60 feet long, location of ground line.

American Standards Assn., Telephone Group. O5c1–1931 and O5c2–1931. Western Red Cedar Poles. Tentative standard for quality covering requirements on prohibited and permissible kinds and amounts of defects, permissible rot, grain twist, pole sweep, length tolerances, peeling, sawing of ends, trimming. Standard dimensions for poles from 16 to 90 feet long, location of ground line.

National Electric Light Assn. Suggested Specifications. D1–22T; 1922. Tentative. Western Red Cedar Poles. Requirements on general quality, permissible defects and their location in pole, permissible sweep, classification of poles according to butt and top dimensions for various length poles. Published in 1922 N. E. L. A. proceedings.

National Electric Light Assn. Handbook on Overhead Line Construction; 1914, p. 127. Suggested Specifications. Eastern White Cedar Poles. For 3 classes of poles, minimum dimensions of top and butt for various lengths, permissible defects and their location, permissible sweep, allowable hollow heart.

Northern White Cedar Assn. Manufacture and Grading of Northern White Cedar Poles; 1925. For poles cut from live timber and 16 feet or more in length, requirements on peeling and trimming, standard top measurements, permissible rot, crook, cat faces, knot, twist, standard weights.

Western Red Cedar Assn. Western Red Cedar Poles; 1929. Requirements on peeling and trimming, permissible variations in length, permissible defects and sweep, minimum top and butt measurements for various length poles.

References.—Preservative treatment. *See also* 400.42, 400.43. Fiber stress in poles. *See* 401.30. Standard sizes, depth of setting. *See also* 401.30.

401.32 Chestnut Poles

American Electric Railway Engr. Assn. D8–26; 1926. Standard specifications for wood poles. Timber quality specifications, minimum diameters of poles of various lengths of three classes of poles used in trolley and combined trolley and auxiliary line support construction, for chestnut poles.

American Standards Assn., Telephone Group. O5d1–1931 and O5d2–1931. Chestnut Poles. Tentative standard for quality covering requirements on prohibited and permissible kinds and amounts of defects, grain twist, pole sweep for town and country poles, length tolerances, peeling, sawing of ends, trimming. Standard dimensions and location of ground line for poles from 16 to 70 feet long.

National Electric Light Assn. Suggested Specifications. D2–23T; 1923. Tentative. Chestnut Poles. Permissible defects and their location in pole, requirements on finish and permissible sweep, classification of poles according to butt and top dimensions for various length poles. Published in 1923 N. E. L. A. proceedings.

References.—Preservative treatments. *See also* 400.42. 400.43. Fiber stress in poles. *See* 401.30. Standard sizes, depth of setting. *See also* 401.30.

401.33 Cypress Poles

401.34 Fir Poles

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Pole Stock. For Douglas fir pole stock, definitions of 1 quality grade, permissible defects, required grain slope.

401.35 Oak Poles

401.36 Pine Poles

American Standards Assn., Telephone Group. O5e1–1931 and O5e2–1931. Southern Pine Poles. Tentative standard for quality covering requirements on species of wood, prohibited and permissible kinds and amounts of defects, grain twist, pole sweep, length tolerances, peeling, sawing of ends, trimming, framing, storage and handling. Standard dimensions and locations of ground line for poles from 16 to 90 feet long.

National Electric Light Assn. Suggested Specification. D5–24T; 1924. Creosoted Yellow Pine Poles. Permissible types, sizes and location of defects, requirements on trimming, creosote specifications, full cell and empty cell treating processes, amount of preservative used, dimensions of five classes of poles. Published in 1924 N. E. L. A. proceedings.

References.—Preservative treatment. *See also* 400.42, 400.43. Fiber stresses in poles. *See* 401.30. Standard sizes, depth of setting. *See also* 401.30.

401.37 Redwood Poles

National Electric Light Assn. Handbook on Overhead Line Construction, 1914, p. 131. Suggested Specifications. Sawed Redwood Poles. For 2 classes of poles, top and butt dimensions for various lengths, permissible sapwood, knots, and other defects.

References.—*See* references under 401.36.

401.4 PILING, HEWN AND SAWN

401.40 General Items

American Railway Engineering Assn. 1929 Manual. Wooden Bridges and Trestles. Timber Piles; 1928. Permissible sizes of defects, number of rings in close-grained piles, amount of sapwood for piles to be treated, dimensions of southern pine, douglas fir, oak, cypress, and western red cedar piles, straightness requirements.

American Society for Testing Materials. Tentative Specifications. D25–30T; 1930. Timber Piles. Covers untreated round timber suitable for piles and also timber suitable for treatment, requirements on general quality, permissible knots and other defects for first class and second class piles, peeling, dimensions and permissible variations.

American Wood Preserver's Assn. 14b; 1926. Standard Volumes of Piles and Poles. Table of volumes per foot of length for various diameters of small and large ends.

401.41 Cedar Piling

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Timber Piles. For cedar piles, requirements on percentage of heartwood, permissible knots, bend, bark, and defects, peeling, diameters at tip and at 4 feet from butt for various lengths.

American Railway Engineering Assn. 1929 Manual. Wooden Bridges and Trestles. Timber Piles; 1928. Includes cedar piles, permissible sizes and types of defects, number of rings for close grained piles, amount of sapwood for piles to be treated, dimensions, straightness requirements.

Western Red Cedar Assn. Standard Cedar Piling; 1914. Requirements on production, permissible butt rot, standard lengths, sizes of butts and tops, permissible crook, cat faces, and dry streaks.

References.—Requirements for piles irrespective of specie. *See* 401.40. Preservative treatment. *See* 400.42.

401.42 Chestnut Piling

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Timber Piles. For chestnut piles, requirements on percentage of heartwood, permissible knots, bend, bark and defects, peeling, diameters at tip and at 4 feet from butt for various lengths.

References.—Requirements for piles irrespective of specie. *See* 401.40. Preservative treatments. *See* 400.42.

401.43 Cypress Piling

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Timber Piles. For cypress piles, permissible knots, bend, bark, and defects, requirements on percentage of heartwood, peeling, diameters at tip and at 4 feet from butt for various lengths.

American Railway Engineering Assn. 1929 Manual. Wooden Bridges and Trestles. Timber Piles. Includes cypress piles, permissible sizes and types of defects, number of rings for close grained piles, amount of sapwood for piles to be treated, dimensions, straightness requirements.

American Society of Municipal Engineers. Sewers; 1927. Includes cypress piles used in sewer construction, general quality, straightness, minimum dimensions of ends for various lengths.

References.—Requirements for piles irrespective of specie. *See* 401.40. Preservative treatment. *See* 400.42.

401.44 Fir Piling

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Timber Piles. For Douglas fir piles, required percentage of heartwood, permissible knots, bend, bark, and other defects, requirements on peeling, diameters of tip and at 4 feet from butt for various lengths.

American Railway Engineering Assn. 1929 Manual. Wooden Bridges and Trestles. Timber Piles; 1928. Includes fir piles, permissible sizes and types of defects, number of rings for close grained piles, amount of sapwood for piles to be treated, dimensions, straightness requirements.

References.—Requirements for piles irrespective of specie. *See* 401.40. Preservative treatment. *See* 400.42.

401.45 Oak Piling

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Timber Piles. For oak piles, permissible knots, bend, bark, and defects, requirements on percentage of heartwood, peeling, diameters at tip and at 4 feet from butt for various lengths.

American Railway Engineering Assn. 1929 Manual. Wooden Bridges and Trestles. Timber Piles; 1928. Includes oak piles, permissible sizes and types of defects, number of rings for close grained piles, amount of sapwood for piles to be treated, dimensions, straightness requirements.

References.—Requirements for piles irrespective of specie. *See* 401.40. Preservative treatment. *See* 400.42.

401.46 Pine Piling

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Timber Piles. For piles of southern yellow pine, permissible knots, bend, bark, and defects, requirements on percentage of heartwood, peeling, diameters at tip and at 4 feet from butt for various lengths.

American Railway Engineering Assn. 1929 Manual. Wooden Bridges and Trestles. Timber Piles; 1928. Includes pine piles, permissible sizes and types of defects, number of rings for close grained piles, amount of sapwood for piles to be treated, dimensions, straightness, requirements.

References.—Requirements for piles irrespective of specie. *See* 401.40. Preservative treatment. *See* 400.42.

401.47 Redwood Piling

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Timber Piles. For redwood piles, permissible knots, bend, bark, and defects, requirements on percentage of heartwood, peeling, diameters at tip and 4 feet from butt for various lengths.

California Redwood Assn. California Specifications for Structural Grades of Redwood; 1930. Round Redwood Piling. Requirements on taper, straightness, straightness of grain, annual rings per inch, permissible defects, dimensions for various lengths.

References.—Requirements for piles irrespective of specie. *See* 401.40. Preservative treatment. *See* 400.42.

401.49 Miscellaneous Specifications for Piling

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Sheet Piling. For timber sheet piling, requirements on general quality and nonpermitted defects, tongue and groove construction, sharpening of lower ends.

American Society of Municipal Engineers. Sewers; 1927. Includes wood piles used in sewer construction, general quality, permissible kinds of wood, straightness requirements, minimum dimensions of ends for various length piles.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Sheet Piling. Requirement on number of sound edges and faces, permissible defects.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Untreated Timber Piles. Of any satisfactory species, cut from live trees, nonadmissible defects, minimum allowed diameters of tip and butt, for foundation piles and trestle piles.

U. S. Gov., Dept. of Commerce. Bureau of Standards. Simplified Practice Recom. R16–29; 1929.

Lumber. American Lumber Standards for softwood lumber. For sheet piling, standard sizes and dressed dimensions, basic rules for quality grading.

References.—Requirements for piles irrespective of specie. *See* 401.40. Preservative treatment. *See* 400.42.

401.5 SHIP'S KNEES

401.6 CORDWOOD

401.9 MISCELLANEOUS SPECIFICATIONS FOR RAW AND HEWN TIMBERS

American Walnut Mfrs. Assn. Rules for Grading American Black Walnut Logs; 1930. Definitions of 4 grades of logs with dimension and length limits, permissible defects in each grade, standard method of measuring.

Lumbermen's Club of Memphis. Rules for Measurement and Inspection of Logs; 1924. Standard lengths, definitions of defects, grading requirements as regards permissible defects, presence of sap, diameter, twist, etc., for 3 grades of red and white oak, white ash, yellow poplar, cypress, red gum, cottonwood, elm, maple, basswood, tupelo, and black gum, rules for measuring logs.

402. ROUGH LUMBER

402.1 SAWN STAKES AND CROSS ARMS

American Electric Railway Engr. Assn. Recommended Specification. D102–29; 1929. Overhead Line Material for Direct and Catenary Suspension. Includes wood cross arms with wood according to Spec. D100 of Nat. Elec. Light Assn., requirements on boring, dimensions and permissible variations for light service and heavy service arms up to 8-pin sizes.

American Railway Assn., Electrical Section. VI–a–23; 1923. Electric Light, Power Supply and Trolley Lines Crossing Railways. Cross arms. For fir or southern pine cross arms for use at crossings, cross-sectional requirements for 2 to 8 pin sizes, permissible stresses.

American Railway Assn., Electrical Section. VI–b–25; 1925. Construction of Overhead Electric Supply Lines for Railroad Use on Railroad Property. Cross arms. For wooden cross arms, permissible minimum section dimensions, permissible unit stresses for fir and yellow pine arms, strength requirements when installed on pole and braced.

American Railway Assn. Telegraph and Telephone Section. 1–A–28; 1929. Douglas Fir Cross arms. For standard cross arms for steel pins and for wood pins and for cross arms with special pole pin spacing, requirements on finish, number of annual rings, slant of grain, permissible sapwood, defects, and warp, dimensions of cross arms and of cross arm gage.

American Railway Assn. Telegraph and Telephone Section. 1–A–29; 1929. Treated Southern Yellow Pine Cross Arms. For standard cross arms for steel pins and for wood pins and for cross arms with special pole pin spacing, requirements on finish, number of annual rings, slant of grain, permissible sapwood, defects, and warp, dimensions of cross arms and of cross arm gage, amount of preservative with method of application and material requirements according to A. R. A. specifications.

National Electric Light Assn. Suggested Specification. D100–24T; 1924. Untreated Wood Cross Arms (Material). For cross arms of Douglas fir and long leaf yellow pine, requirements on annual ring count, permissible types and amount of defects, gauging accuracy. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications. D109–28T; 1928. Tentative 2 Pin Cross Arm (Low Voltage). D125–28T; 1928. Tentative. 2 Pin Cross Arm. (Medium Voltage.) For wood cross arms, dimensions and allowable variations for one size of each, gaging of holes, 4 sides surfaced, wood in accordance with D100–22.

National Electric Light Assn. Suggested Specifications. D110–22; 1922. 4 Pin Cross Arm (Low Voltage). D111–22. 1922; 6 Pin Cross Arm (Low Voltage). D112–22; 1922. 8 Pin Cross Arm (Low Voltage). D120–22; 1922. 6 Pin Alley Arm (Low Voltage). D130–22; 1922. 2 Pin Cross Arm (Medium Voltage). D 131–22; 1922. 4 Pin Cross Arm (Medium Voltage). For wood cross arms, surfaced on 4 sides, dimensions and allowable variations, gaging of holes. Published in 1924 N. E. L. A. proceedings.

U. S. Gov., Dept. of Commerce. Bureau of Standards. H10; 1927. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the Installation and Maintenance of Electrical Supply and Communication Lines. For cross arms of yellow pine or fir, permissible minimum cross-section dimensions for various numbers of insulator pins for various grades of line construction.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Cross Arm Stock of Douglas Fir. Definition of 1 quality grade, permissible defects, required ring count and grain slope.

References.—Gage for bolt hole sizes in cross arms. *See* 615.82. Grading rules for cypress, fir, pine. *See* 400.22, 400.23, 400.26. Preservative treatment. *See* 400.4.

402.2 FENCING, GUARD RAILS, SCAFFOLDS, AND FALSE WORK

California Redwood Assn. California Specifications for Structural Grades of Redwood; 1930. Defines 2 grades of all-heart lumber for railing timbers, wheel guards, etc., as regards annual rings per inch, angle of grain, permissible defects, dimensions of rough and of dressed sizes.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Wire Cable Guard Rail. Requirements on construction, minimum size, and minimum strength of steel cable, quality of posts, construction method and painting.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Wood Guard Rail. For wood rail and posts, requirements on grade of lumber for sawed rail and posts, on preparation and general quality of round posts, painting and paint mixture, preservative treatment of posts, construction of guard fence.

References.—Redwood grading rules. *See* 400.27.

402.3 WOOD BLOCKS FOR PAVEMENTS AND FLOORS

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Creosoted Wood Paving Blocks. For blocks of yellow pine, Douglas fir, tamarack, and Norway pine, general quality and freedom from defects requirements, limiting dimensions; composition, specific gravity, and distillation requirements for coal-tar paving oil and for coal-tar distillate oil as preservatives, treatment procedure, required preservative content of blocks.

American Assn. of State Highway Officials. Tentative Method T–63. Undated. Method of Sampling and Testing Wood Block. Requirements on size of sample, methods for determination percentage of moisture, of oil, and of rosin.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Creosoted Wood Block Pavements; 1929. Grading, subgrade and foundation according to A. R. E. A. specifications for concrete pavements, wood of Douglas fir, Norway pine, yellow pine, tamarack, western larch, general quality and proportions of blocks, description of 3 permissible methods of laying, expansion joints.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Wood Block Floors; 1929. Foundation according to A. R. E. A. specifications, general quality, size and proportions of blocks, treatment in accordance with specifications of American Wood Preservers Assn., methods of laying blocks and of providing expansion joints.

American Society of Civil Engineers. Committee Report. Materials for Road Construction and Standards for Their Test and Use; 1918. Includes wood block pavements, recommendations on maximum road grade, crown, artificial foundation, available woods, disallowed defects, size of blocks, annual rings, type of preservative, method of treatment with preservative, construction of pavement, methods of test of preservative.

American Society of Municipal Engineers. Creosoted Wood Block Paving; 1921. Wood for blocks of yellow pine, fir, tamarack, Norway pine, hemlock or black gum, general quality, number of annual rings, and percentage of heart wood requirements, test requirements for preservative oils, treatment procedure, pitch and asphalt fillers, and construction of pavement.

American Society for Testing Materials. D 52–20; 1920. Wooden Paving Blocks for Exposed Pavements. Covers southern yellow pine, Douglas fir, tamarack, Norway pine, hemlock, or black gum woods, general quality, number of annual rings, percentage of heartwood, limiting dimensions, treatment procedure using pressure process, and retention of preservative requirements.

American Wood Preserver's Assn. 16b; 1923. Creosoted Wood Block Street Paving. Of southern yellow pine, Douglas fir, tamarack, or Norway pine, size of blocks, creosote treatment procedure for blocks, pavement construction for concrete foundation with paint coat or mortar bed or mastic cushion construction, physical and chemical requirements for bituminous filler.

American Wood Preserver's Assn. 19b; 1923. Interior Creosoted Wood Block Flooring. Of southern yellow pine, Douglas fir, tamarack, or Norway pine, size of blocks, requirements on percentage creosote, construction of floor for bituminous paint coat on concrete base or for mortar bed or bituminous mastic cushion on concrete base, requirements for coal tar pitch for filler.

References.—Preservative treatments. *See* 400.4. Road construction. *See also* 518.1, 518.2, 518.3. Bituminous fillers. *See* 505.15. Sand filler. *See* 512.16.

402.4 YARD LUMBER

References.—Other yard lumber. *See* 411. Structural and factory lumber. *See* 412, 413. Am. Lumber Standards for softwood yard lumber. *See* 400.0.

402.41 Strips

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes strips, defects, dressed dimensions and rough sizes, grade definitions for 4 grades in conformity with American Lumber Standards, moisture content requirements.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Strips, Grading according to Am. Lumber Standards, definitions of quality grades giving permissible defects, standard dimensions.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Cherry Strip. For clear and No. 1 common grades, definitions of grades, length and width limits, permissible defects, sapwood, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Mahogany Strips. For clear, No. 1 common, and wormy, definitions of grade, width and length limits, permissible defects, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Plain and Quartered Oak Strips. For clear, clear sap, No. 1 common, and No. 2 common, definitions of grade, width and length limits, permissible defects, sapwood, etc., slant of grain for quartered oak.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Poplar Strips. For clear, sap, No. 1 common, No. 2 common, definitions of grade, width and length limits, permissible defects, sapwood, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Strips. For clear, No. 1 and No. 2 common, definitions of grade, length and width limits, permissible defects.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Common Boards and Strips. For 5 grades of strips, definitions of grade including standard lengths and permissible short pieces, permissible defects and crook, sizes in accordance with American Lumber Standards.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929 and Suppl. No. 2. Common Boards and Strips. Definitions of 4 common grades, permissible defects, standard sizes, permissible moisture content for air dried or kiln dried material. Conforms to American Lumber Standards.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Kiln Dried Strips. River plate standard, definition of 1 grade, permissible defects, sizes. Does not cover dressed and surfaced lumber.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Strips. West Indian (export grade), definitions of 4 quality grades.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. Common Lumber. Definitions of 5 common grades, permissible defects, standard sizes, for above woods. In conformity with Am. Lumber Standards.

References.—Am. Lumber Standards for softwood strips. *See* 400.0. Grades for boards. *See* 402.42.

402.42 Boards

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circulars No. 5, No. 10, No. 12; 1923. Crates for Furniture (Case Goods), Crates for Furniture and Lamps, Crates for Upholstered Furniture. Includes lumber for crates, permissible moisture and allowable defects, permissible woods arranged into four groups depending on strength and nail holding qualities.

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes common boards, defects, dressed dimensions and rough sizes, grade definitions for 4 grades in conformity with American Lumber Standards, moisture content requirements.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Common Boards. Grading according to Am. Lumber Standards, definitions of quality grades, Nos. 1, 2, and 3 common giving permissible defects, standard dimensions.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. For cypress yard lumber, definitions of grades, standard dimensions, permissible defects for 5 finish grades, 4 common grades, and peck grade. Standard dimensions and permissible defects for panel stock.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Common Boards and Strips. For 5 grades of common boards, definitions of grade, including standard lengths and permissible short pieces, permissible defects and crook, sizes in accordance with American Lumber Standards.

Pacific Lumber Inspection Bureau (Inc.) Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for boards and ship plank for export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Common Boards. Definitions of 5 common grades, standard sizes and dressed dimensions, permissible defects. In conformity with Am. Lumber Standards with the addition of a peck grade.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929 and Suppl. No. 2. Common Boards and Strips. Definitions of 4 common grades, permissible defects, standard sizes, permissible moisture content for air dried or kiln dried material. Conforms to American Lumber Standards.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Boards and Planks. Export grades, definitions of 5 quality grades, permissible defects and sapwood, sizes. Does not cover dressed and surfaced lumber.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Boards and Planks. River plate standard, definition of 1 grade, permissible defects, sizes. Does not cover dressed and surfaced lumber.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Boards and Planks. West Indian (export grade). Definitions of 4 quality grades, sizes.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Kiln Dried Saps. Air Dried Saps. Export grade for boards and dimension of sapwood, definitions of 1 grade of each, permissible defects, sizes. Does not cover dressed and surfaced lumber.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Boards. For fir, hemlock, and spruce, definitions of 5 common grades; for red cedar, definitions of 4 common grades, permissible defects, standard sizes. In conformity with Am. Lumber Standards except for addition of a selected common grade.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Rough Clears. For Douglas fir, hemlock and spruce, definitions of 2 quality grades for each of air dried or kiln dried and definitions of 2 grades of green clears for each of 3 thickness ranges, permissible defects, sizes and dimensions. In conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. Common Lumber. Definitions of 5 common grades, permissible defects, standard sizes, for above woods. In conformity with Am. Lumber Standards.

References.—American Lumber Standards for softwood boards. *See* 400.0. Other shipping crate specifications. *See* 954.36. Wooden boxes. *See* 953.3. Finish. *See also* 411.43. Plank. *See also* 412.1. Shop and factory board. *See* 413. Strips. *See* 402.41.

402.43 Dimension Lumber

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes dimension lumber, defects, dressed dimensions and rough sizes, grade definitions for 3 common grades in conformity with American Lumber Standards, moisture content requirements.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Dimension, Heavy Joists and Small Timbers. Grading according to Am. Lumber Standards, definitions of Nos. 1, 2, and 3 Common with permissible defects and waste, standard dimensions.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Squares. For 2 grades including a clear heart grade, permissible crook, sapwood, size and number of knots.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Select Dimension and Common Dimension. Definitions of grade, permissible defects, heart-center, etc., for any hardwood specified for construction work.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Harwood Lumber, Cypress, Veneers, Plywood; 1931. Squares. Sizes 3 by 3 to 12 by 12, for 5 grades, length limits, permissible defects, permissible wane and sapwood for various woods, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Standard Turning Squares. For sizes ½-inch to 5 inches, length limitations, definitions for 2 grades including permissible defects, wane, etc.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Dimension. Definitions of 5 grades of common, including standard lengths, permissible defects and crook. In conformity with Am. Lumber Standards.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Heavy Joists. Definitions of 2 grades of common, including permissible defects, for 4 by 8 inches and wider and 6 by 10 inches and wider. In conformity with Am. Lumber Standards.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for dimension lumber applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Dimension. Definitions of 5 common grades, permissible defects, standard sizes and dressed dimensions. In conformity with Am. Lumber Standards with addition of a peck grade.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Turning Squares. For 2 sizes, dimensions, permissible sapwood and defects.

Southern Pine Assn. Grades of Dense Longleaf and Shortleaf Southern Yellow Pine Timbers. 1927 with 1928 Supplement. Utility Timbers. Definitions of 3 grades, merchantable, square edge and sound, and No. 1 common, including permissible sapwood and defects.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. Dimension and Heavy Joists. Definitions of 3 common grades, permissible defects, allowable crook, dressing sizes. In conformity with Am. Lumber Standards.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Deals. Export grades, definitions of 5 quality grades, permissible defects and sapwood, sizes. Does not cover dressed and surfaced lumber.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Dimension. Export grades, definitions of 4 grades, permissible sapwood and defects, sizes. Does not cover dressed and surfaced lumber.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Kiln Dried Saps. Air Dried Saps. Export grades for boards and dimension of sapwood, definitions of 1 grade of each, permissible defects, sizes. Does not cover dressed and surfaced lumber.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Scantling. Export grades, definitions of 5 grades, permissible sapwood and defects, sizes. Does not cover dressed and surfaced lumber.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Scantling and Deals. River plate standard, definition of 1 grade, permissible defects, sizes. Does not cover dressed and surfaced lumber.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Scantling and Deals. West Indian (export trade), definitions of 4 quality grades, sizes.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Dimension, Plank, and Small Timbers. For Douglas fir, hemlock, and spruce, definitions of 4 common grades; for red cedar, definition of 2 common grades, permissible defects, standard sizes. In conformity with Am. Lumber Standards except for addition of selected common grade for first 3 woods.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Nonstructural Timbers and Stringers. For Douglas fir, definition of 4 common grades of timber and 2 common grades of stringers, for red cedar, definitions of 2 common grades of timbers, permissible defects. In conformity with Am. Lumber Standards except for additional selected common grade for fir.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Rough Clears. For Douglas fir, hemlock, and spruce, definitions of 2 quality grades for each of air dried or kiln dried and definitions of 2 grades of green clears for each of 3 thickness ranges, permissible defects, sizes and dimensions. In conformity with Am. Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Turning Squares. For Douglas fir and spruce, definition of 1 quality grade for each, permissible defects.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, Western Red Cedar Lumber; 1929. Windmill Stock. For Douglas fir stock, definition of selected common grade of timber, permissible defects, standard sizes.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, and Idaho White Pine Lumber; 1929. Common Lumber. Definitions of 5 common grades, permissible defects, standard sizes, for above woods. In conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. Dimension. Definitions of 3 grades of dimension of white fir, Douglas fir, spruce, or cedar, permissable defects. In conformity with Am. Lumber Standards.

References.—Am. Lumber Standards for softwood dimension lumber. *See* 400.0. Hardwood grading rules. *See* 400.3. Structural timbers. *See also* 412.1, 412.9. Plank. *See also* 412.1. Furniture dimension stock. *See* 413.53.

402.5 LATHS AND SHINGLES

402.51 Lath

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes lath, dimensions and permissible defects for 2 grades of common lath, dimensions and quality requirements for 1 grade of byrkit lath.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Lath. Standard dimensions, allowable scantiness, permissible defects.

Contracting Plasterers' International Assn. Outline Specification for Lathing and Plastering; 1930. Wood Lath. Standard thickness and width of No. 1 grade lath.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Hardwood Lath. For 2 grades, standard length, required dimensions green and dry, permissible defects.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack. Lumber; 1927. Hemlock Lath and Byrkit Lath. Definitions of 3 grades of hemlock lath including standard lengths and permissible defects for each grade. For byrkit lath, definitions of 2 grades with permissible waste and standard size and pattern.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Lath grading rules for export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. Southern Pine Lath, Byrkit Lath. Definitions of 2 grades of pine lath, permissible defects, standard sizes. Definition of 1 grade of byrkit lath, permissible defects, standard pattern and dimensions.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Byrkit Lath of Douglas Fir. Definition of 1 quality grade, permissible defects, standard sizes and pattern. In conformity with Am. Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Lath. For green and dry lath of fir, hemlock, spruce, and cedar, definitions of 2 grades of each, permissible defects.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. Lath. Definitions of 2 grades for each of above woods, definitions of 2 mixed grades, permissible defects, standard sizes in conformity with Am. Lumber Standards.

References.—Am. Lumber Standards for byrkit lath. *See* 400.0. Lathing practice. *See* 514.63. Metal lath. *See* 605.24.

402.52 Shingles

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Shingles. Dimensions, definitions of two grades with permissible defects, packing provisions.

Northern White Cedar Assn. Manufacture and Grading of Northern White Cedar Products; 1923. Shingles. Definitions of 3 grades with permissible defects, dimensions, and permissible percentage of narrow widths.

Red Cedar Shingle Bureau. Grading and Packing Rules; 1931. Definitions of grade, permissible defects, width limits, and packing rules for 3 sizes of random width shingles and 3 grades, definitions of 2 grades of dimension shingles, packing and count requirements. In conformity with commercial standard CS31–31 issued by Bureau of Standards, U. S. Dept. of Commerce.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Shingles. Definitions of 5 quality grades as regards dimensions, permissible and nonpermitted defects.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. Shingles. Definitions of 4 grades, permissible defects, minimum dimensions, allowable sapwood.

U. S. Gov., Dept. of Commerce. Bureau of Standards CS31–31; 1931. Red Cedar Shingles. A commercial standard selected and accepted by industry establishing quality standards for western red cedar shingles, requirements on edge grain structure, disallowed defects, length, width, and thickness, running inches per bundle, and unit for standard packing, grading tolerance, definitions, covering capacity information.

U. S. Gov., Dept. of Commerce. Bureau of Standards. Simplified Practice Recom. R16–29; 1929. Lumber. American Lumber Standards for softwood lumber. For red cedar shingles, standard sizes, definitions of 4 quality grades, required percentage of clear material, permissible sapwood, minimum width shingle in each size, packing and count.

References.—Asphalt shingles. *See* 505.16.

402.6 STRUCTURAL TIMBERS AND SHOP LUMBER

References.—Structural timbers, shop lumber. *See* 412, 413.

402.7 SOFTWOOD LUMBER SPECIFICATIONS

References.—Softwood grading rules. *See* 400.2. Structural timbers. *See* 412.

402.70 General Items

U. S. Gov., Federal Specifications Board. 533a; 1927. Yard and Factory Softwood Lumber. Requires purchase of lumber under grading rules of the various lumber associations where these rules are in conformity with American Lumber Standards (Publ. R16 of U. S. Bureau of Standards). List of associations whose grading rules conform, and a comparative table of grades of yard lumber products cut from various species of softwoods.

402.8 HARDWOOD LUMBER SPECIFICATIONS

References.—Hardwood grading rules. *See* 400.3. Structural timbers. *See* 412.

402.9 MISCELLANEOUS SPECIFICATIONS FOR SAWN LUMBER

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Plain Sawn Flitch. Definition of grade, not applicable to veneer flitch.

Pacific Lumber Inspection Bureau, Inc. Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for panel flitches of western red cedar applicable to the export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Cedar Capping and Grooved Trunking, definitions of 1 quality grade of each, permissible defects, required heart wood, waterproofness, and method of cutting groove.

References.—Veneer and furniture stock. *See also* 413.52, 413.53.

403. SURFACED AND WORKED LUMBER

403.1 DRESSED LUMBER

References.—Dressed lumber. *See* 411, 413.

403.2 MATCHED, SHIP-LAPPED, AND PATTERNED LUMBER

References.—Matched, shiplapped, and patterned lumber. *See* 411, 413.

404. LUMBER FOR PRESERVATIVE TREATMENT

404.0 GENERAL ITEMS

American Wood Preservers' Assn. 2c; 1929. Standards for the Purchase and Preservation of Treatable Timber. Requirements on quality of wood, amount of sapwood, peeling, seasoning, stacking, framing, recommendations on amount and kind of treatment.

References.—Preservative treatment of lumber. *See* 400.4.

411. YARD LUMBER FOR GENERAL BUILDING PURPOSES

411.0 GENERAL ITEMS

U. S. Gov., Dept. of Commerce. Bureau of Standards R16–29; 1929. Lumber. American Lumber Standards, recommended and accepted by industry. For softwood yard lumber, basic definitions of standard select and common grades, yard and industrial size standards, description, measurement, and tally. Covers grades, sizes, and patterns for siding, flooring, ceiling, partition, molding, finish, shiplap, dressed and matched, etc.

411.1 SIDING

American Railway Assn. Mechanical Div. Siding, Flooring, Roofing, and Lining; 1912. For siding, standard dimensions for 2 widths of tongued and grooved siding.

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes drop and bevel siding, definitions of defects, dimensions of standard patterns, definitions of grades and permissible defects, in conformity with American Lumber Standards, end matched drop siding is included.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Siding. Grading according to Am. Lumber Standards, definitions of quality grades with permissible sapwood and defects, standard dimensions of bevel, drop, and bungalow siding, definition of C. R. A. additional grade of clear heart lumber.

California Redwood Assn. Standard Patterns of Worked Redwood Lumber; 1917 and Supplement No. 1; 1928. For siding, dimensions of standard patterns (illustrated) of bevel, drop, bungalow, economy, anzac, and log cabin siding.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Drop Siding, and Bevel Siding. Definitions of 1 select and 3 common grades of siding including standard lengths and permissible short pieces, permissible defects and crook, sizes and pattern in accordance with American Lumber Standards.

Pacific Lumber Inspection Bureau (Inc.) Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for siding applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Bevel Siding, Bungalow Siding, and Drop Siding. In conformity with Am. Lumber Standards, definitions of 4 grades of each, dimensions and permissible defects and sapwood.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929 and Suppl. No. 2. Barn Siding. Definitions of 4 common grades, standard lengths and sizes, permissible defects, crook, and moisture content, standard patterns. Conforms to American Lumber Standards.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. Bevel Siding. Definitions of 2 select and 3 common grades of siding, permissible defects, standard lengths, sizes and patterns, permissible moisture content for air dried or kiln dried material. Conforms to American Lumber Standards.

Southern Pine Assn. Grades for Long Leaf and Short Leaf Southern Pine Lumber; 1929. Drop Siding and End Matched Drop Siding. Definitions of 2 select and 3 common grades of drop siding and of 4 grades of end-matched drop siding, permissible defects, standard lengths, sizes and patterns, permissible moisture content for air dried or kiln dried material. Conforms to American Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Bevel Siding. Definitions of 3 quality grades for each of Douglas fir, hemlock, spruce, and red cedar, permissible defects, standard sizes. In conformity with Am. Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Bungalow or Colonial Siding. Definition of 1 quality grade for each of Douglas fir, hemlock, and spruce, definitions of 3 grades for red cedar, permissible defects, standard sizes. In conformity with Am. Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Drop Siding, Rustic Siding. For Douglas fir and hemlock, definitions of 3 grades of each, permissible defects, standard sizes and patterns. In conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. Colonial Siding, Bungalow Siding, Bevel Siding. Definitions of 4 quality grades for above woods except larch, definition of 3 grades for larch, an "E" grade included, permissible defects, standard sizes and patterns. In conformity with Am. Lumber Standards.

White Pine Assn. of the Tonawandas. Grades of Northern White Pine Lumber as Made in the Tonawandas; 1922. Barn Siding. Definitions of 3 grades, permissible defects.

References.—Am. Lumber Standards for softwood siding. *See* 411.0.

411.2 FLOORING

411.21 Cedar Flooring

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Porch Flooring of Cedar. Definitions of 2 quality grades, permissible defects. In conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Pondersosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. For cedar flooring, standard patterns with dimensions.

References.—Am. Lumber Standards for softwood flooring. *See* 411.0.

411.22 Cypress Flooring

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Flooring. In conformity with Am. Lumber Standards, definitions of 4 quality grades as regards permissible defects and sapwood, standard dimensions and pattern.

References.—Am. Lumber Standards for softwood flooring. *See* 411.0.

411.23 Fir and Douglas Fir Flooring

Pacific Lumber Inspection Bureau (Inc.) Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for Douglas Fir flooring applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Flooring of Douglas Fir. Definitions of 5 quality grades of vertical grain flooring and of 4 grades of flat grain flooring, required angle of grain, permissible defects, standard sizes and patterns. In conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, California White Pine, Sugar Pine, Idaho White Pine, etc.; 1929. For Douglas and white fir for flooring, standard patterns with dimensions.

References.—Am. Lumber Standards for softwood flooring. *See* 411.0.

411.24 Hemlock Flooring

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Flooring. Definitions of 1 select and 3 common grades of flooring including standard lengths and permissible short pieces, permissible defects and crook, sizes and patterns in accordance with American Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Flooring of Hemlock. Definitions of 5 quality grades of vertical grain flooring and of 4 grades of flat grain flooring, kiln dried, required angle of grain, permissible defects, standard sizes and patterns. In conformity with Am. Lumber Standards.

References.—Am. Lumber Standards for softwood flooring. *See* 411.0.

411.25 Maple Flooring

Maple Flooring Manufacturers Assn. Grading Rules for Northern Hard Maple, Beech and Birch Flooring; 1927. For 3 grades, standard dimensions, proportions of various lengths in each grade, permissible defects in each grade, requirement for kiln drying and end matching.

References.—Am. Lumber Standards for softwood flooring. *See* 411.0. Hardwood grading rules. *See* 400.3.

411.26 Oak Flooring

Oak Flooring Manufacturers Assn. of the U. S. Oak Flooring Grading Rules; 1931. Definitions of 3 grades of quartered oak and of 4 grades of plain oak flooring, as regards permissible defects, average length and permissible amount of short lengths per bundle, standard thicknesses, widths, and counts.

References.—Am. Lumber Standards for softwood flooring. *See* 411.0. Hardwood grading rules. *See* 400.3.

411.27 Pine Flooring

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes standard and factory flooring, definitions of defects, definitions of grades with permissible defects, in conformity with American Lumber Standards, dimensions.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. End Matched Flooring. Definitions of 4 grades of flat grain and 3 grades of edge grain flooring, length limits, standard sizes and patterns, permissible defects, and moisture content. Conforms to American Lumber Standards.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. Factory Flooring and Decking. Definition of 1 common grade, permissible crook and defects, standard workings. In conformity with Am. Lumber Standards.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. Flooring. Definitions of 7 grades of flat grain and of 6 grades of vertical grain flooring, standard sizes and patterns, permissible defects, and moisture content. Conforms to American Lumber Standards.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Flooring. Export grades, definitions of 7 quality grades, permissible defects and sapwood, sizes. Does not cover dressed and surfaced lumber.

Southern Pine Assn. Southern Yellow Pine Car Material; 1919. Car Flooring. Definitions of all-heart, heart face, and No. 1 common grades, with permissible defects for each, standard dimensions and patterns.

Western Pine Assn. Grading Rules for Ponderosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Etc.; 1929. For flooring of western pines, standard patterns with dimensions.

References.—Am. Lumber Standards for softwood flooring. *See* 411.0.

411.28 Spruce Flooring

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Flooring. For spruce flooring, kiln dried, definition of 1 quality grade, permissible defects, standard sizes and patterns. In conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Etc.; 1929A. For spruce flooring, standard patterns with dimensions.

References.—Am. Lumber Standards for softwood flooring. *See* 411.0.

411.29 Miscellaneous Flooring Specifications

American Railway Assn. Mechanical Div. Siding, Flooring, Roofing, and Lining; 1912. For flooring, dimension requirements for 6 widths and various thicknesses of flooring of 3 types, square edged, shiplapped, tongue and groove, dressed all over.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Flooring. Grading according to Am. Lumber Standards, dimensions, two grades according to amount of heart wood and permissible defects, definition of C. R. A. additional clear heart grade.

California Redwood Assn. Standard Patterns of Worked Redwood Lumber; 1917. For flooring, dimensions of standard patterns, illustrated.

Maple Flooring Manufacturers Assn. Grading Rules for Northern Hard Maple, Beech, and Birch Flooring; 1927. For three grades, standard dimensions, proportions of various lengths in each grade, permissible defects in each grade, requirement for kiln drying and end matching.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Tamarack Flooring. Definitions of 1 select and 3 common grades of flooring, including standard lengths and permissible short pieces, permissible defects and crook, sizes and patterns in accordance with American Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Etc.; 1929. For larch flooring, standard patterns with dimensions.

References.—Am. Lumber Standards for flooring of soft wood. *See* 411.0. Hardwood grading rules. *See* 400.3.

411.3 CEILING LUMBER

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes ceiling lumber, definitions of defects, definitions of grades with permissible defects, in conformity with American Lumber Standards, dimensions.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Ceiling. Grading according to Am. Lumber Standards, definitions of two grades with permissible sapwood and defects, standard dimensions, definition of C. R. A. additional clear heart grade.

California Redwood Assn. Standard Patterns of Worked Redwood Lumber; 1917. For ceiling, dimensions of standard patterns, illustrated.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Ceiling. Definitions of 1 select and 3 common grades of ceiling, including standard lengths and permissible short pieces, permissible defects and crook, sizes and patterns in accordance with American Lumber Standards.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for ceiling lumber applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Ceiling. In conformity with Am. Lumber Standards, definitions of 4 quality grades as regards permissible defects and sapwood, standard dimensions and patterns.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. Ceiling. Definitions of 2 select and 3 common grades, standard sizes and patterns, permissible defects, permissible crook, and moisture content. Conforms to American Lumber Standards.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. End Matched Ceiling. Definitions of 4 grades, length limits, permissible crook and defects, standard sizes and patterns, moisture content. Conforms to American Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Ceiling. Definitions of 3 quality grades for fir, 3 grades for hemlock, and 1 grade for spruce, permissible defects, standard sizes and patterns. In conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Etc.; 1929. For ceiling lumber, standard patterns, definitions of quality grades for the various species of wood covered.

References.—Am. Lumber Standards for softwood ceiling. *See* 411.0. Hardwood grading rules. *See* 400.3.

411.4 PARTITION LUMBER, MOLDINGS, AND FINISH LUMBER

411.41 Partition Lumber

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes partitions, definitions of defects, definitions of grades with permissible defects, in conformity with American Lumber Standards, dimensions.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Partition Lumber. Grading according to Am. Lumber Standards, definitions of two grades with permissible sapwood and defects, standard dimensions, definition of C. R. A. additional clear heart grade.

California Redwood Assn. Standard Patterns of Worked Redwood Lumber; 1917. For partitions, dimensions of standard patterns, illustrated.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Partition. Definitions of 1 select and 3 common grades of partition including standard lengths and permissible short pieces, permissible defects and crook, sizes and patterns in accordance with American Lumber Standards.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Partition. In conformity with Am. Lumber Standards, definitions of 4 quality grades as regards permissible defects and sapwood, standard dimensions.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. Partition. Definitions of 2 select and 3 common grades of partition, permissible defects, standard sizes and patterns, permissible moisture content. Conforms to American Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Partition. Definitions of 3 quality grades for Douglas fir and hemlock and of 1 grade for spruce, permissible defects, standard sizes and patterns. In conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Etc.; 1929. For partition lumber, standard patterns with dimensions, definitions of quality grades for the various species of wood covered.

References.—Am. Lumber Standards for softwood partition. *See* 411.0. Hardwood grading rules. *See* 400.3.

411.42 Moldings

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes moldings, definitions of defects, definitions of grades with permissible defects, dimensions, in conformity with American Lumber Standards.

Arkansas Soft Pine Bureau. Wood Moldings and Universal Sizes; 1930. Illustrated hand book of molding patterns with dimensions.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Lattice Moldings, Casing, and Base. Definitions of grades, permissible defects, standard lengths.

Hardwood Interior Trim Manufacturers Assn. Rules and Regulations for Hardwood Interior Trim and Molding; 1928. Permissible defects for one grade, requirements on seasoning checks and warp, allowable moisture, designs and sizes to conform to American Lumber Standards.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Battens. Definitions of No. 1 Common grade or better as regards permissible defects, to be made according to molding book patterns, standard sizes and workings.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Moldings. Same as Am. Lumber Standards for grade B finish or better.

Southern Pine Assn. Grades of Longleaf and Shortleaf Southern Pine Lumber. 1929. Molded Casing and Base, Window and Door Jambs. Casing and base according to Am. Lumber Standards for sizes and patterns, definitions of 3 grades, permissible crook, defects, and moisture content.

Southern Pine Assn. Grades of Longleaf and Shortleaf Southern Pine Lumber; 1929. Moldings. Sizes and patterns in accordance with Am. Lumber Standards, definitions of 1 grade, permissible defects, moisture content, standard lengths.

West Coast Lumbermens Assn. Grading And Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Casing and Base. For Douglas fir casing and base, definitions of 3 quality grades, permissible defects. In conformity with Am. Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber. 1929. Battens. For fir, hemlock, and red cedar battens, definitions of 1 grade of each, permissible defects, standard sizes and patterns.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Molding. For fir, hemlock, spruce, and red cedar molding, definitions of 1 grade for each of 2 width ranges, permissible defects, in conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce and Cedar Lumber; 1929. Moldings. Definition of C and better grade for above woods, permissible defects, standard lengths. In conformity with Am. Lumber Standards.

White Pine Assn. of the Tonawandas. Grades of Northern White Pine Lumber as Made in the Tonawandas; 1922. Moldings. Definitions of 2 quality grades for moldings and of stained sap and star clear grades for inside finish and trim, permissible defects, standard widths and lengths.

References.—Am. Lumber Standards for softwood molding and interior trim. *See* 411.0. Hardwood grading rules. *See* 400.3.

411.43 Finish Lumber

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Finish. Definitions of 3 grades, permissible defects and crook, standard lengths and sizes, moisture content requirements. In conformity with Am. Lumber Standards.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. For finish, definitions of 3 grades of finish including a clear heart grade, permissible defects for each grade, standard lengths, standard sizes and dressed dimensions, in conformity with American Lumber Standards.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Thin Lumber, and Plywood; 1931. Cypress Finish. Definitions of 5 grades including a clear heart grade, permissible defects for each grade, standard widths and lengths.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Panel and Wide No. 1. 18 inches wide and over of poplar, cottonwood, and gum, length limits and permissible defects.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Finishing Lumber. Definitions of one grade, including standard lengths and permissible amounts of short pieces, permissible defects and crook, standard dressed dimensions in conformity with American Lumber Standards.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Finish. Definitions of 5 grades, standard sizes and dressed dimensions, permissible defects. In conformity with Am. Lumber Standards with additional grade of clear heart finish.

Southern Cypress Manufacturers Assn. Standard Grades and Classification of Cypress; 1929. Panel Stock. Definitions of 3 finish grades as regards permissible defects, dimensions and lengths, with clear heart finish in addition to A and B finish of Am. Lumber Standards.

Southern Pine Assn. Grades of Longleaf and Shortleaf Southern Pine Lumber; 1929. Finish. Definitions of 3 quality grades, standard lengths, permissible crook and defects. In conformity with Am. Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Finish. For fir, hemlock, and cedar, definitions of 3 quality grades, for spruce, definitions of 2 grades, permissible defects, standard sizes. In conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Pondosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. Finish. Definitions of 3 select grades for above woods except larch, definitions of 2 grades for larch, permissible defects, standard sizes. In conformity with Am. Lumber Standards with a few exceptions on sizes.

White Pine Assn. of the Tonawandas. Grades of Northern White Pine Lumber as Made in the Tonawandas; 1922. Finish. Definitions of 2 quality grades, permissible defects, standard widths and lengths.

White Pine Assn. of the Tonawandas. Grades of Northern White Pine Lumber as Made in the Tonawandas; 1922. Shelving and Dressing. Definitions of 2 quality grades suitable for inside and outside finishing, permissible defects.

References.—Am. Lumber Standards for softwood finish. *See* 411.0. Hardwood grading rules. *See* 400.3.

411.5 SHIP-LAP LUMBER

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes shiplap, definition of defects, dimensions, grade definitions and permissible defects, in conformity with American Lumber Standards.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Ship-lap. Grading according to Am. Lumber Standards, definitions of quality grades with permissible sapwood and defects, standard dimensions.

California Redwood Assn. Standard Patterns of Worked Redwood Lumber; 1917. For ship-lap, dimensions of standard patterns, illustrated.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Dressed and Matched and Ship-lap. For ship-lap, definitions of 5 grades of common, including standard lengths and permissible short pieces, permissible defects and crook, sizes in conformity with American Lumber Standards.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for ship-lap applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Ship-lap. In conformity with Am. Lumber Standards, definitions of 4 quality grades as regards permissible defects and sapwood, standard dimensions and pattern.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. Heavy Ship-lap. Definition of 1 common grade, permissible crook and defects, standard sizes and patterns.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929 and Suppl. No. 2. Ship-lap. Definitions of 4 common grades, standard lengths and sizes, permissible defects, crook, and moisture content, standard pattern. Conforms to American Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Ship-lap. For fir and hemlock, definitions of 5 common grades, for red cedar, definitions of 4 common grades, permissible defects, standard pattern. In conformity with Am. Lumber Standards except for addition of a selected common grade.

Western Pine Assn. Grading Rules for Pondosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Etc.; 1929. Ship-lap. Standard sizes and patterns, definitions of grades with permissible defects.

References.—Am. Lumber Standards for softwood ship-lap. *See* 411.0. Hardwood grading rules. *See* 400.3.

411.6 DRESSED AND MATCHED YARD LUMBER

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes dressed and matched yard lumber, defect definitions, dimensions and grade definitions with permissible defects, in conformity with American Lumber Standards, moisture content requirements.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Dressed and Matched Yard Lumber. Grading according to Am. Lumber Standards, definitions of quality grades with permissible sapwood and defects, standard dimensions.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Dressed and Matched and Ship-lap. Definitions of 5 grades of common, including standard lengths and permissible short pieces, permissible defects and crook, sizes in conformity with American Lumber Standards.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929 and Suppl. No. 2. Dressed and Matched. Definitions of 4 common grades, standard sizes, permissible crook and defects, permissible moisture content. Conforms to American Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Dressed and Matched. Definitions of 5 common grades for fir and hemlock and of 4 common grades for red cedar, permissible defects, standard sizes and patterns, in conformity with Am. Lumber Standards except for addition of a selected common grade.

Western Pine Assn. Grading Rules for Pondosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Etc.; 1929. Dressed and Matched. Standard sizes and dressed dimensions, definitions of quality grades with permissible defects for each grade.

References.—Am. Lumber Standards for softwood D. & M. *See* 411.0. Hardwood grading rules. *See* 400.3.

411.7 ROOFING LUMBER

American Railway Assn. Mechanical Div. Siding, Flooring, Roofing, and Lining; 1912. For roofing and lining, standard dimensions of 2 widths of tongued and grooved roofing and lining.

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Grooved Roofing. Definition of No. 1 common grooved roofing, permissible defects, standard pattern and standard groove, in conformity with American Lumber Standards.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Heavy Roofing and Decking. Grading according to Am. Lumber Standards, definitions of No. 1 and No. 2 Common with permissible defects, standard dimensions.

Southern Cypress Mfrs. Assn. Grades and Classifications of Cypress; 1929. Grooved Roofing. Standard pattern and groove with dimensions for grooved roofing are the same as the standard of Arkansas Soft Pine Bureau.

Southern Pine Assn. Grades of Dense Longleaf and Shortleaf Southern Yellow Pine Timbers; 1927 with 1928 Supplement. Factory Flooring and Roofing Plank. Definitions of 2 quality grades, permissible sapwood and defects, standard lengths and standard workings.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929 and Suppl. No. 2. Grooved Roofing. Definitions of 4 common grades, standard lengths, sizes and groove dimensions, permissible crook, defects, and moisture content. Conforms to American Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Etc.; 1929. Grooved Roofing. Standard pattern with standard sizes and dimensions, grade definitions including permissible defects in each grade.

References.—Am. Lumber Standards for softwood roofing. *See* 411.0. Hardwood grading rules. *See* 400.3. Wood shingles. *See* 402.52.

411.8 SHELVING

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for spruce shelving applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

White Pine Assn. of the Tonawandas. Grades of Northern White Pine Lumber as Made in the Tonawandas; 1922. Shelving. Definitions of 4 quality grades, permissible defects.

411.9 MISCELLANEOUS SPECIFICATIONS FOR BUILDING LUMBER

Pacific Lumber Inspection Bureau (Inc.) Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for stepping and decking applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. End-Matched Concrete Form Lumber, End-Matched Sheathing and Subflooring. Definition of 1 grade, standard lengths, permissible defects, in conformity with American Lumber Standards.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS26–30; 1930. Aromatic Red Cedar Closet Lining. A commercial standard selected and accepted by industry for clothes closet lining covering requirements on species of wood, standard thicknesses, lengths, widths, details of matching, percentage of heartwood, and permissible defects.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Cedar Porch Decking, Flooring and Ceiling, definitions of 2 grades, permissible defects.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Corn Cribbing. For Douglas fir cribbing, green or air dried, definitions of 2 quality grades, permissible defects, standard pattern for beveled type.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Stepping. For fir, hemlock, and spruce, definitions of 2 quality grades of vertical grain stepping, permissible defects.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Turned Porch Columns. For Douglas fir, definition of 1 grade of green or air dried columns; for red cedar, definition of 1 quality grade for porch columns and newels, permissible defects in each grade.

References.—Am. Lumber Standards. *See* 411.0. Hardwood grading rules. *See* 400.3.

412 STRUCTURAL TIMBERS AND BRIDGES

412.0 GENERAL ITEMS

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Basic Grading of Structural Timber. Grading in accordance with American Lumber Standards, requirements on measurements of knots and defects, number of annual rings in yellow pine and douglas fir, amount of summer wood, standard dimensions, permissible amount and location of defects, for select and common grades for joists, plank, beams, stringers, posts, and timbers, requirements on percentage of heartwood in untreated timber.

American Mining Congress. Committee Report on Mine Timbering; 1923. Kinds and sizes of timber, method of timbering in roadways and permanent air courses, recommended sizes of ties for steel rails, drawings of corner framing.

American Railway Engineering Assn. 1929 Manual. Wooden Bridges and Trestles. Grading Rules and Classification of Timber and Lumber for Railway Uses; 1929. Commercial names, use and size classification, definitions of defects and blemishes differing slightly from American Lumber Standards, abbreviations, American Lumber Standards for softwood lumber, including specifications for structural wood joist, plank, beams, stringers, and posts, working stresses for structural timbers under various use exposures, classes of lumber to be used for various structural parts of bridges and buildings.

American Railway Engineering Assn. 1929 Manual. Wooden Bridges and Trestles. Structural Wood Joist, Plank, Beams, Stringers, Posts, and Timbers. Permissible variations from nominal dimensions for rough and for surfaced materials, permissible defects, location and sizes of knots, required slope of grain, heartwood, ring count, etc., for various grades and species of structural timber.

American Society for Testing Materials. D 9–30; 1930. Definitions of Terms Relating to Timber. Definition of structural timber, of terms relating to wood, of standard defects, commercial names and botanical names of woods used for structural timbers.

American Society for Testing Materials. D 245–30; 1930. Structural Wood Joist, Planks, Beams, Stringers and Posts. Structural grades of quality, use, and size in conformity with "Basic Provisions for the Selection and Inspection of Softwood Dimension and Timbers Where Working Stresses are required" adopted at the General Lumber Conference in 1925, permissible variations from nominal dimensions, permissible sizes and location of knots in various sizes of lumber, maximum shake, checks, and wane, requirements on density and location of radial lines for various woods.

Southern Pine Assn. Grades of Dense Longleaf and Shortleaf Southern Yellow Pine Timbers; 1927 with 1928 Supplement. Structural Joists and Plank. Definitions of 2 grades, dense heart and structural square edge and sound, including density requirements, amount of heart, and permissible defects, standard sizes.

U. S. Gov., Dept. of Commerce. Bureau of Standards. Simplified Practice Recom. R16–29; 1929. Lumber. American Lumber Standards for softwood lumber. For structural dimension and timber where working stresses are required, general regulations to be used as a basis for the preparation of grading rules by manufacturers, standard method for measurement of defects, density, etc., definitions of dense Douglas fir and dense southern pine.

412.1 STRUCTURAL TIMBERS

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Timber Cribbing. Requirements on grade of timber or general quality of logs, least dimensions of timbers or of logs, minimum dimensions of mud sills, construction, length of ties, fastening means, method of filling, etc.

American Railway Engineering Assn. 1929 Manual. Wooden Bridges and Trestles. Construction Oak; 1921. Where strength and durability are controlling items, definition of firsts, names of oaks included under white oak or red oak. For structural timbers of white oak, disallowed defects, permissible amount of boxed hearts and wane in various sized pieces.

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes dimension timbers and joists, definitions of defects, dimensions, definitions of grades with permissible defects, in conformity with American Lumber Standards, moisture content requirements.

Associated Factory Mutual Fire Insurance Companies. Longleaf Pine Factory Timber; 1916. For beams, columns, and plank in slow burning construction, requirements as to density, amount of rosin, heartwood and growth rings, permissible defects.

California Redwood Assn. California Redwood in Structural Grades; 1930. Structural Grades in conformity with Am. Lumber Standards for structural joists and plank, structural beams and stringers, and structural posts and timbers, definitions of 4 quality grades of each class as regards permissible knots, sapwood, and other defects, with permissible bending stress for each grade, required ring count.

California Redwood Assn. California Specifications for Structural Grades of Redwood; 1930.

Definitions of 3 quality grades as regards required ring count, permitted and nonadmissable defects, rough sizes and dressed dimensions.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Dimension, Heavy Joists and Small Timbers. Grading according to Am. Lumber Standards, definitions of Nos. 1, 2, and 3 Common with permissible defects and waste, standard dimensions.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Crossing Plank. Definitions of grade, permissible defects.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Sound Square Edge, and Common Timbers. Definitions of grade, permissible defects.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Step Plank. For 1¼ to 2 inch planks, for 2 grades, definitions of grade, limiting dimensions, permissible defects.

Northern Hemlock and Hardwood Mfrs. Assn. Grading Rules for Hemlock and Tamarack Lumber; 1927. Timbers. Permissible defects in No. 1 Common of sizes 4 by 4 to 8 by 8 and larger, in No. 2 Common of sizes 4 by 4 and 4 by 6, in mine and dock structural timber of sizes 10 by 10 and larger.

Pacific Lumber Inspection Bureau (Inc.). Schedule N. 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for timbers applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Timbers. For No. 1 grade nonpermissible defects, heartwood requirement.

Southern Pine Assn. Grades of Dense Longleaf and Shortleaf Southern Yellow Pine Timbers; 1927 and 1928 Supplement. Structural Joists and Plank. Definitions of 2 grades, dense heart and structural square edge and sound, including density requirements, amount of heart, and permissible defects, standard sizes.

Southern Pine Assn. Grades of Dense Longleaf and Shortleaf Southern Yellow Pine Timbers; 1927 with 1928 Supplement. Structural Timbers. Definitions of 3 grades, select, dense heart, and structural square edge and sound, including density requirements, amount of heart, permissible defects.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929 and Suppl. No. 1 and No. 2. Dimension and Heavy Joists. Definitions of 3 common grades, permissible defects, allowable crook, standard dressing sizes.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Dimension. Export grades, definitions of 4 grades, permissible sapwood and defects, sizes from 6 by 6 and up. Does not cover dressed and surfaced lumber.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Merchantable Sawn Timber. Export grade, definition, lengths. Does not cover dressed and surfaced lumber.

Southern Pine Assn. Southern Yellow Pine Bridge and Trestle Timbers for Railway Structures; 1917. Stringers, Caps, Sills, Posts, Struts, Girts, Braces, Ties, and Guard Rails. Definitions of 2 quality grades, requirements on percentage of heart wood, permissible defects.

Southern Pine Assn. Southern Yellow Pine Car Material; 1919. Car Sills and Framing. Definitions of No. 1 common heart and No. 1 common grades with permissible defects and permissible scant measurement when dry.

U. S. Gov., Dept of Commerce. Bureau of Standards. Simplified Practice Recom. R16–29; 1929. Lumber. American Lumber Standards for softwood lumber. For joist and plank, beams and stringers, and posts and timbers, permissible sizes of knots, shakes, checks, and wane, required slope of grain for 2 quality grades.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Posts and Timbers, Structural. For Douglas fir, definitions of 3 quality grades, permissible defects, close grain requirements; for red cedar, definition of 1 quality grade, permissible defects, recommended working stresses for different exposure conditions. In conformity with Am. Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Structural Joist, Rafters, Plank, and Small Timbers, definitions of 3 grades for fir and of 1 grade for red cedar, permissible defects, close grain requirements for fir timber, in conformity with Am. Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Structural Stringers, Girders, and Beams, definitions of 3 grades for fir and of 1 grade for red cedar, permissible defects, close grain requirements for the fir timbers, in conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. Dimension and Timber. Definitions of 3 grades of white fir, Douglas fir, spruce, or cedar timbers, permissible defects. In conformity with Am. Lumber Standards.

Western Pine Assn. Structural Grades of Larch and Inland Empire Douglas Fir; 1931. Published as supplement to 1929 standard grading rules for yard and factory lumber, definitions of grades, requirements on closeness of grain and density, permissible kinds, amounts, and location of defects, recommended working stresses for joists, plank, structural posts, and timbers.

References.—Other specifications for structural timber. *See* 412.0. Am. Lumber Standards for structural grades. *See* 412.0 under U. S. Gov. Hardwood grading rules. *See* 400.3. Planks, dimension lumber and joists. *See also* 402.42, 402.43. Heavy flooring and roofing. *See also* 411.2, 411.7, 412.9. Sheet piling. *See* 401.49. Permissible unit stresses. *See* 400.12. Methods of testing for strength, moisture, etc. *See* 400.13.

412.2 BRIDGES

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Timber Structures. For bridges, requirements on grades of lumber to be used for the various bridge members, framing and boring of treated timber, preservative coating of surfaces of untreated timbers and of pile heads, sizes of bolt holes, construction of pile bents, stringers, wheel guards, trusses, etc., painting.

American Electric Railway Engr. Assn. Misc. Methods and Practices. B209–26; 1926. Design of Small Bridges, Culverts, and Trestles. Shows maximum recommended sizes of pipe and drawings of typical designs of concrete box culverts, concrete arch culverts, I-beam spans on concrete abutments, frame and pile trestles.

American Railway Engineering Assn. 1929 Manual. Wooden Bridges and Trestles. Requirements for metal details, workmanship on pile and frame trestles, specifications for timber piles, grading rules and classification of timber and lumber for railway uses, specifications for construction oak and structural oak timbers.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Bridge and Dock Timbers. For any hardwood, definitions of one grade, permissible defects.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Timber Structures, including bridges, requirements on grade of lumber applicable to various members of structure, minimum absorption for treated timbers, thickness of floor planks, methods of construction for pile bents, stringers, etc., materials according to standard specifications specified.

References.—Timber for bridges. *See also* 412.0, 412.1. Bridge flooring. *See also* 411.2, 412.9. Permissible unit stresses. *See* 400.12. Methods of testing for strength, moisture, etc. *See* 400.13.

412.9 MISCELLANEOUS SPECIFICATIONS FOR STRUCTURAL TIMBERS AND BRIDGES

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Bridge Floors. For plank floor, requirements on grade of lumber, construction of single plank and of double plank floors. For laminated or strip floors, requirements on grade of lumber, construction, construction of subfloors for wood block wearing surface.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Bridge Plank. No. 1 and No. 2 grades, width and length limits, definitions of grade, permissible defects.

Southern Pine Assn. The Gulf Coast Classification of Pitch Pine Resawn Lumber and Sawn Lumber; 1923. Decking. Export grades, definitions of 2 quality grades, all heart and heart face, permissible defects, sizes. Does not cover dressed and surfaced lumber.

413. SHOP OR FACTORY LUMBER

413.0 GENERAL ITEMS

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Pattern and Shop Lumber. Grading in accordance with Am. Lumber Standards, for one grade of shop lumber, requirements on percentage of cuttings of given size, permissible defects and sapwood.

California Redwood Assn. Western Grades; 1929. Shop Lumber. Requirements on percentage sap and percentage of cuttings above certain sizes, permissible defects.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Factory Lumber. In conformity with Am. Lumber Standards except as to dressed dimensions of 3 of 11 standard sizes, definitions, standard dimensions, permissible defects and sapwood for firsts, seconds, selects, No. 1 shop, No. 2 shop, and box.

U. S. Gov., Dept. of Commerce. Bureau of Standards. Simplified Practice Recom. R16–29; 1929. Lumber. American Lumber Standards for softwood lumber. For factory plank, basic grade classification into 5 grades dependent on percentage of first or second quality door cuttings available, definitions of 2 grades of door cuttings, standard sizes of cuttings.

U. S. Gov., Dept. of Commerce. Bureau of Standards. Simplified Practice Recom. R16–29; 1929. Lumber. American Lumber Standards for softwood lumber. For shop lumber, general requirements forming basis for classification into 6 classes, 3 of which are dependent on percentage of first or second quality cuttings available, sizes of cuttings, general quality classification of cuttings.

Western Pine Assn. Grading Rules for Ponderosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Etc.; 1929. Factory Lumber. Standard Thicknesses for factory lumber surfaced on 2 sides.

413.1 TANK STOCK LUMBER

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Tank Stock, Silo Staves. Grading in accordance with Am. Lumber Standards, definition of 1 grade with permissible defects and amount of sapwood, definition of C. R. A. additional clear heart grade.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Cypress. For tank and boat stock, standard thicknesses, width and length limits, permissible defects and sapwood for 1 grade.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for fir tank stock applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Tank and Boat Stock. Standard dimensions, permissible defects for 1 grade.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Silo staves, of Douglas fir, definitions of 3 quality grades, permissible defects, water-tight requirements.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Tank Stock, Rough Green. For fir and red cedar tank stock, definitions of 1 quality grade for each, permissible sapwood and defects. In conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, California White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. Tank Stock. General requirements for 1 grade.

References.—Am. Lumber Standards for softwood factory and shop lumber. *See* 413.0 under U. S. Gov. Hardwood grading rules. *See* 400.3.

413.2 CAR STOCK LUMBER

413.20 General Items

American Railway Assn. Mechanical Div. Recommended Practice. Lumber; 1910. Description of various woods used by railroads for car and locomotive lumber, schedule of lumber adopted in 1916 indicating the kind and grade that should be used in each part of the car or locomotive.

American Railway Assn. Mechanical Div. Recommended Practice. Sections of Car Lumber; 1930. Dimensions of 13 standard sections or patterns of car lumber, siding, flooring, etc., requirements on moisture content when lumber is applied to car.

413.21 Fir Car Stock

American Railway Assn. Mechanical Div. Recommended Practice; 1910. Lumber. Includes Douglas fir car and locomotive material, classification, grading and dressing rules, definitions and illustrations of knots and other defects.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Car Material of Douglas Fir. Definitions of 3 grades of car framing, of 3 grades of green running board, of 2 grades of car siding, of 3 grades of car lining, of 1 grade of insulation, of 3 grades of car roofing, of 4 grades of car decking, and of 3 grades of horizontal sheathing, permissible defects for each grade.

Western Pine Assn. Grading Rules for Larch and Douglas Fir Railroad Car Material. 1931. Published as supplement to 1929 standard grading rules for yard and factory lumber, definitions of grades and permissible defects for running boards, car lining, car roofing, car siding, car decking, and horizontal sheathing.

References.—Species of lumber recommended for various uses. *See* 413.20. Am. Lumber Standards for softwood factory and shop lumber. *See* 413.0 under U. S. Gov. Hardwood grading rules. *See* 400.3.

413.22 Mahogany Car Stock

References.—*See* references under 413.21.

413.23 Oak Car Stock

American Railway Assn. Mechanical Div. Recommended Practice; 1910. Lumber. Includes locomotive, freight and passenger car oak, classification, grading and dressing rules, definition and illustrations of knots and other defects.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Select Car Stock, Freight Car Stock. White oak for select grade and white or red oak for freight car stock, definitions of grade, permissible defects.

References.—Species of lumber recommended for various uses. *See* 413.20. Am. Lumber Standards for softwood factory and shop lumber. *See* 413.0 under U. S. Gov. Hardwood grading rules. *See* 400.3.

413.24 Pine Car Stock

American Railway Assn. Mechanical Div. Recommended Practice; 1910. Lumber. Includes white and Norway pine and southern yellow pine car material, classification, grading and dressing rules, definitions and illustrations of knots and other defects.

Southern Pine Assn. Southern Yellow Pine Car Material; 1919. Car Decking or Flooring. Definitions of all-heart, heart face, and No. 1 common grades, with permissible defects for each, standard dimensions and patterns.

Southern Pine Assn. Southern Yellow Pine Car Material; 1919. Car Siding, Lining, and Roofing. Definitions of 1 select and 2 common grades, permissible defects, standard dimensions and patterns.

Southern Pine Assn. Southern Yellow Pine Car Material; 1919. Car Sills and Framing. Definitions of No. 1 common heart and No. 1 common with permissible defects and allowable scant measurement when dry.

References.—Species of lumber recommended for various uses. *See* 413.20. Am. Lumber Standards for softwood factory and shop lumber. *See* 413.0 under U. S. Gov. Hardwood grading rules. *See* 400.3.

413.25 Spruce Car Stock

American Railway Assn. Mechanical Div. Recommended Practice; 1910. Lumber. Includes eastern spruce, classification, grading and dressing rules, definition and illustrations of knots and other defects.

References.—*See* references under 413.24.

413.26 Hemlock Car Stock

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Hemlock Car Material. Definitions of 2 grades of car siding, 3 grades of car lining, and 3 grades of car roofing, permissible defects.

References.—*See* references under 413.24.

413.29 Miscellaneous Car Stock

American Railway Assn. Mechanical Division. Recommended Practice; 1910. Lumber. List of the woods used by railroad companies, schedule of kind and grade of lumber used in the detail parts of cars and locomotives, classification, grading and dressing rules for northern pine car material, including white and Norway pine and eastern spruce, for southern yellow pine car material, for locomotive freight and passenger car oak, for Douglas fir car and locomotive material, for cypress car material, with definitions and illustrations of knots and other defects.

American Railway Assn. Mechanical Div. Lining for Outside Framed Cars; 1917. Standard dimensions of tongued and grooved lining for 3 standard thicknesses.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Car Roofing and Siding, Car Lining. Definition of 1 grade of each as regards permissible defects.

Western Pine Assn. Grading Rules for Larch and Douglas Fir Railroad Car Material. 1931. Published as supplement to 1929 standard grading rules for yard and factory lumber, definitions of grades and permissible defects for running boards, car lining, car roofing, car siding, car decking, and horizontal sheathing.

References.—Species of lumber recommended for various uses. *See* 413.20. Am. Lumber Standards for softwood factory and shop lumber. *See* 413.0 under U. S. Gov. Hardwood grading rules. *See* 400.3.

413.3 AIRPLANE STOCK LUMBER

413.31 Softwood Airplane Stock

413.32 Hardwood Airplane Stock

413.4 SHIP STOCK LUMBER

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Decking. For No. 1 common grade, definition of grade, permissible defects, standard sizes, lengths, and dressed dimensions, standard workings.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Decking. Definitions of 2 common grades, permissible defects, crook and cup, standard lengths, standard workings, in conformity with Am. Lumber Standards.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Cypress. For tank and boat stock, standard thicknesses, width and length limits, permissible defects and sapwood for 1 grade.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for ship plank and decking applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929.

Tank and Boat Stock. Standard dimensions, permissible defects for 1 grade.

Southern Pine Assn. Grades of Longleaf and Shortleaf Southern Pine Lumber; 1929. Decking. Definition of No. 1 common grade, permissible defects and crook, standard sizes and dressed dimensions, standard workings, in conformity with American Lumber Standards.

Southern Pine Assn. Gulf Coast Classification of Pitch Pine; 1923. Decking. Standard sizes. definitions of 2 quality grades, permissible defects for each grade.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Ship Decking, Rough Ship Plank. For fir material, definition of 1 quality grade for each, permissible defects.

References.—Am. Lumber Standards for softwood factory and shop lumber. *See* 413.0. Hardwood grading rules. *See* 400.3.

413.5 STOCK FOR WOODEN HANDLES, FURNITURE, AND VEHICLES

413.51 Handle Stock Lumber

References.—Handles for agricultural implements and for tools. *See* 428.1, 428.2.

413.52 Veneer and Plywood

American Society for Testing Materials. D 45–17T; 1917. Tentative Specifications. Canned Food Boxes, Wirebound Construction. Includes veneer for box construction, requirements on kiln drying of lumber, permissible size, type, and location of knots.

Douglas Fir Plywood Institute. Douglas Fir Plywood Grading Rules; 1928. Applications and uses of 4 grades, grade names, no very definite quality requirements for the grades.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Thin Lumber and Plywood; 1931. Rotary Cut Veneer, Cottonwood, Cypress, Gum, Poplar, Sycamore, Tupelo, and Yellow Pine. For 8 types and grades, definitions of grade, permissible defects, width and length limits, rules for measurement, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Sawn and Sliced Piano Rim Stock, Plywood. Permissible defects in center stock, definitions of 4 grades of faces and 3 grades of backs for panels and tops with requirements on matching, allowable discoloration, etc., definitions of 3 grades of lumber cores.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Sawn and Sliced Veneer of Plain White and Red Oak. For 2 grades, thickness, width and length limits, definitions of grade, permissible defects, sapwood, streaks, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Sawn and Sliced Veneer of Quartered White and Red Oak. For 3 grades, thickness, width, and length limits, definitions of grade, permissible defects, sapwood, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Sawn Red Gum Veneer. For 2 grades of quartered red gum, figured and unfigured, definitions of grade, thickness, width, and length limits, permissible defects.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Veneer, Rotary Cut Ash, Basswood, Beech, Birch, Elm, and Maple. For 6 grades, definitions of grade, permissible defects, width and length limits, rules for measurement, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Veneer, Rotary Cut Red Oak, White Oak, and Chestnut. For 4 grades, definitions of grade, permissible defects, required amount of clear face cuttings, etc. in each grade, rules of measurement.

Plywood Manufacturers Assn. Rules for Measurement and Inspection of Veneer, Thin Lumber and Plywood; 1926. The rules are the same as those of the National Hardwood Lumber Assn. covering this class of product.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS35–31; 1931. Plywood. A commercial standard selected and accepted by industry establishing grading rules for hardwood and eastern red cedar plywood, including requirements on figure, grain, and color matching, permissible kinds and amounts of defects for 4 grades of faces for the various wood species, construction and permissible defects for various grades of cores and cross banding, standard sizes and quantities of plywood, tolerances on dimensions, definitions of plywood terms.

References.—Am. Lumber Standards for softwood veneer and plywood. *See* 413.0 under U. S. Gov. Hardwood grading rules. *See* 400.3.

413.53 Furniture Stock except Plywood and Veneer

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Furniture Dimension Stock. For clear, select, and common grades of square stock and flat stock, permissible scantiness in thickness and width, permissible defects, woods in which sap wood is a defect, etc.

White Pine Assn. of the Tonawandas. Grades of Northern White Pine Lumber as Made in the Tonawandas; 1922. Uppers and Selects. Definitions of 3 clear grades suitable for piano and organ building, permissible defects.

References.—Veneer and plywood. *See* 413.52. Am. Lumber Standards for softwood furniture stock. *See* 413.0 under U. S. Gov. Hardwood grading rules. *See* 400.3. Wooden furniture. *See* 430–439.

413.54 Wagon and Vehicle Stock Lumber

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes wagon bottoms, definitions of defects, dimensions, definitions of grades with permissible defects.

National Assn. of Farm Equipment Manufacturers. Wagon Material; 1921. National Hardwood Lumber Assn. Grading rules for No. 1 and No. 2 wagon stock, axles, bolsters, sandboards, brake beams, poles, reaches, eveners, singletrees, neck yokes, sawed felloes, requirements on kinds of wood, general quality of wood, standard dimensions, and permissible defects.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Vehicle Lumber. For 4 grades, definitions of grade, width and length limits, permissible defects, pin worm holes, stain, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Wagon Stock—Axles. For No. 1 and No. 2 hickory axles, definitions of grade, required length, permissible defects, etc.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Wagon

Stock—Bolsters and Sandboards. Of oak or hickory, No. 1 and No. 2 grades, definitions of grade, permissible defects.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Wagon Stock—Box Boards. For poplar, cottonwood, gum, tupelo, magnolia, and basswood boxboards, for 1 grade, width and length limits, standard thickness, permissible defects.

National Harwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Wagon Stock—Eveners, Single Trees, Brakebeams, and Neck Yokes. Of hickory, No. 1 and No. 2 grades, definitions of grade, permissible defects.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood. 1931. Wagon Stock—Reaches and Poles. Of oak or hickory, No. 1 and No. 2, grades, definitions of grade, permissible defects.

National Hardwood Lumber Assn. Rules for Measurement and Inspection of Hardwood Lumber, Cypress, Veneers, Plywood; 1931. Wagon Stock—Sawn Felloes. Of oak, No. 1 and No. 2 grades, definitions of grade, permissible defects.

Southern Pine Assn. Grades for Long Leaf and Short Leaf Southern Pine Lumber; 1929. Wagon Bottoms. Definitions of 2 quality grades, standard thickness, minimum stock width, moisture content, permissible defects. Conforms to American Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Fir Wagon Bottoms, definition of 1 quality grade, standard sizes, permissible defects.

References.—Railway car stock. *See* 413.2. Ship stock. *See* 413.4. Am. Lumber Standards for softwood shop and factory lumber. *See* 413.0 under U. S. Gov. Hardwood grading rules. *See* 400.3.

413.6 PATTERN STOCK LUMBER

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Pattern and Shop Lumber. Grading in accordance with Am. Lumber Standards, for pattern lumber, definitions of 2 quality grades of clear lumber with permissible flat grain and annual growth rings.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Cedar Shop Lumber. For general cut-up purposes and for pattern lumber, standard dressed dimensions, definitions of 3 quality grades dependent on percentage of certain quality cuttings available, definitions of 2 grades of cuttings with permissible defects, size of cuttings. In conformity with Am. Lumber Standards.

White Pine Assn. of the Tonawandas. Grades of Northern White Pine Lumber as Made in the Tonawandas; 1922. Pattern Lumber. Definitions of 2 select grades and of 2 cut-up grades, permissible defects, standard sizes.

References.—Am. Lumber Standards for softwood pattern lumber. *See* 413.0 under U. S. Gov. Hardwood grading rules. *See* 400.3. Pattern colors. *See* 429.9.

413.7 COOPERAGE STOCK LUMBER

References.—Cooperage. *See* 421.

413.8 DOOR, WINDOW, AND MILLWORK LUMBER

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes molded casing and base, window and door jambs, definitions of defects, definitions of grades for finish, sizes and patterns in accordance with American Lumber Standards.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Casing and Base, Window and Door Frame Stock. Grading in accordance with Am. Lumber Standards, definitions of 2 finish grades, definition of C. R. A. clear heart grade.

Hardwood Interior Trim Manufacturers Assn. Rules and Regulations for Hardwood Interior Trim and Molding; 1928. Permissible defects for 1 grade, requirements on seasoning checks and warp, allowable moisture, designs and sizes to conform to American Lumber Standards.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for Douglas fir door stock applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules western red cedar panel flitches applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Window and Door Frame Stock, Jambs, Etc. In conformity with Am. Lumber Standards, definitions of 3 quality grades as regards permissible defects and sapwood.

West Coast Lumbermens Assn. Grades for Architectural Woodwork; 1930. Millwork Lumber. For 2 quality grades, requirements on moisture content, permissible defects, special properties and allowable defects for the different species of west coast softwoods and hardwoods.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Cut Door Stock. For Douglas fir, hemlock, and spruce, definitions of 3 quality grades of each of stiles, rails, top rails, and muntins, permissible defects.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Factory Lumber. Definitions of 1 select and 3 common grades of Douglas fir, hemlock, and spruce, dependent on percentage of door or sash cuttings, definitions of 3 quality grades of door cuttings with required ring count and permissible defects, sizes of door cuttings. In conformity with Am. Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Factory Plank. Cedar plank for door and sash cuttings, definitions of 3 clear grades and of 3 shop grades dependent on percentage of certain quality cuttings available in each grade, definitions of 2 quality grades of cuttings with permissible defects, size of cuttings. In conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. Factory Grades. Definitions of No. 3 clear factory, No. 1 shop, No. 2 shop, and No. 3 shop, dependent on percentage of door cuttings available, standard sizes and grades of door cuttings with permissible defects, standard thicknesses. In conformity with Am. Lumber Standards.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. Inch Factory Grades. Definitions of inch 3 clear factory and inch shop grades, dependent on percentage of cuttings available, sizes and quality of cuttings suitable for general mill work.

White Pine Assn. of the Tonawandas. Grades of Northern White Pine Lumber as Made in the Tonawandas; 1922. Door and Trim Lumber. Definitions of 3 quality grades dependent on percentage of clear cuttings available, permissible defects.

References.—Am. Lumber Standards for softwood shop and factory lumber. *See* 413.0 under U. S. Gov. Hardwood grading rules. *See* 400.3. Millwork. *See* 423. Molding, casing, baseboard. *See also* 411.42. Finish and panel stock. *See* 411.43.

413.9 MISCELLANEOUS SHOP AND FACTORY LUMBER

National Cigar Box Manufacturers Assn. Cigar Box Lumber. For imitation and veneered cedar, made from sawed bay poplar lumber. For imitation cedar, thickness of tops and ends, permissible percentage of 3 foot lengths, permissible defects, permissible defects for veneered cedar.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules and Basic Schedule of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for fir staves and pipe stock applicable to export trade only, for domestic trade the rules of West Coast Lumbermens Assn. are used.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Box Lumber. Dimensions and permissible defects for 1 grade.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Washing Machine Tub Stock. Definition of B and Better Finish grade in conformity with Am. Lumber Standards.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R59; 1926. Rotary-Cut Lumber Stock for Wire Bound Boxes. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes of softwood stock for boxes, designates standard lengths, widths, and thicknesses.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Box Lumber. Definitions of 3 grades of hemlock and spruce box lumber and 1 grade of red cedar, grades based on percentage of box cuttings available, standard thicknesses.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Cedar Shop Lumber. For general cut-up purposes and for pattern lumber, standard dressed dimensions, definitions of 3 quality grades dependent on percentage of certain quality cuttings available, definitions of 2 grades of cuttings with permissible defects, size of cuttings. In conformity with Am. Lumber Standards.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Fir Pipe Stave Stock. Definitions of 1 quality grade, permissible sapwood and defects.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Ladder Stock. For fir, hemlock, and spruce ladder stock, definition of 1 grade of each, permissible defects, required ring count.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. Box Lumber. Definitions of inch box, thick box, and short box lumber grades, dependent on percentage of cuttings available, size and quality requirements for cuttings.

Western Pine Assn. Grading Rules for Ponderosa Pine, Calif. White Pine, Sugar Pine, Idaho White Pine, Larch, Douglas Fir, White Fir, Spruce, and Cedar Lumber; 1929. Incense Cedar Pencil Stock. Definition of 1 quality grade with permissible defects.

White Pine Assn. of the Tonawandas. Grades of Northern White Pine Lumber as Made in the Tonawandas; 1922. Box Lumber. Definition of 1 grade, permissible defects.

References.—Am. Lumber Standards for softwood shop and factory lumber. *See* 413.0 under U. S. Gov. Hardwood grading rules. *See* 400.3.

414. RAW CORK, RATTAN, AND REED

414.1 CORK

U. S. Gov., Federal Specifications Board. HH–C–571; 1931. Granulated Cork for Insulating Purposes. Requirements on baking, screen grading, and weight.

References.—Cork board or compressed cork. *See* 425.2. Life preservers of cork. *See* 425.3. Cork pipe covering. *See* 707.41.

414.2 RATTAN

414.3 REED

420–429 MANUFACTURES OF WOOD

(Except Furniture)

421. COOPERAGE, BARRELS, BOXES, AND SHOOKS

421.0 GENERAL ITEMS

References.—Standard fruit and vegetable barrel, standard lime barrel. *See* 951.10.

421.1 TIGHT BARREL STAVES

Associated Cooperage Industries of America. Tight Barrel Staves and Heading; 1930. Dimensions, number per barrel, permissible defects for bucked and sawed staves for spirits, oil, turpentine, and pork barrels of oak, gum and gum mixed timbers, and staves for tierces. Dimensions and permissible defects of oak beer staves.

References.—Tight barrel and tub staves. *See also* 951.10, 951.13, 951.24, 951.44, 951.72. Tank stock lumber. *See* 413.1.

421.2 SLACK BARREL STAVES

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circular No. 14; 1924. Slack Barrels and Slack Casks and Inside Packing for Pottery. Circular No. 21. 1927. Slack Barrels and Inside Packing for Glass Tableware. Include staves, kinds of suitable woods classed according to strength and nail holding power, permissible moisture and defects in staves, construction and dimensions of staves.

Associated Cooperage Industries of America. Slack Barrel Staves; 1931. Thickness of staves for various woods, permissible kinds and amounts of defects for 2 grades, dimensions and standard bilge.

References.—Slack barrel staves. *See also* 951.10, 951.13.

421.3 BARREL HEADINGS AND HOOPS

American Railway Assn. Freight Container Bureau. Tentative Specification. Circular No. 14; 1924. Slack Barrels and Slack Casks and Inside Packing for Pottery. Circular No. 21; 1927. Slack Barrels and Inside Packing for Glass Tableware. Includes headings and hoops, kinds of suitable woods classed according to strength and nail holding power, permissible moisture and defects, construction and dimensions of headings and hoops.

Associated Cooperage Industries of America. Coiled Elm Hoops; 1930. Dimensions of keg and barrel hoops, permissible defects.

Associated Cooperage Industries of America. Slack Barrel Heading; 1931. Thickness, permissible defects, woods, construction of 3 grades.

Associated Cooperage Industries of America. Steel Hoops, Width and Gage, for Tight Barrels and Kegs, other than I. C. C. Barrels and Kegs; 1930. Standard dimensions of head hoop, quarter hoop, and bilge hoop for various capacity kegs and barrels.

Associated Cooperage Industries of America. Tight Barrel Staves and Heading; 1930. For circled and square headings, sawing, thickness, length, and construction, permissible defects, kinds of wood for spirits, beer, oil, turpentine, and pork barrels of oak and gum, and for ash tierce headings.

References.—Headings and hoops. *See also* 951.10, 951.13, 951.24, 951.44, 951.72. Steel hoops. *See also* 604.22.

421.4 BOX SHOOKS

Western Pine Assn. Rules for Grading West-pine Box Shooks and Crating; 1925. Definitions of 3 grades, select grade for macaroni, dried fruit, and similar tight packages, standard grade, and merchantable grade for meat boxes, vegetable and machinery crates, permissible defects and moisture content. Applicable to all Inland Empire woods.

References.—Box shook. *See also* 953.30, 953.31, 953.33, 953.35, 953.36, 953.39. Box lumber. *See also* 413.0, 413.9.

421.5 BOXES, BARRELS, CASKS, HOGSHEADS

References.—Barrels, drums, and tubs. *See* 951. Wooden boxes. *See* 953.3. Wooden crates. *See* 954.3. Wooden switch boxes. *See* 715.12.

422. BASKETS

References.—Baskets. *See* 952.

423. MILLWORK

423.0 GENERAL ITEMS

Millwork Institute of California. Service Bulletin 32; 1928. Glossary of Terms and Standard Trade Practices. Standard practice for moisture content, designation of dimensions, glazing, definitions of stiles, rails, bars, sash and windows, types of doors, blinds, shutters, stickings, moldings, astragals, etc., construction and permissible defects in doors of California pine, fir, or Oregon pine.

423.1 WOODEN DOORS

Millwork Institute of California. Architectural Woodwork; 1930. Doors. For solid and veneered doors for exterior and interior openings, including garage doors, cupboard doors, and access doors; permissible defects for various species of wood, requirements on thickness and construction of veneer, panels, and laminated panels, door thickness standards, construction of stile and rail doors and of flush doors, trimming standards.

Millwork Institute of California. Architectural Woodwork; 1930. Screens and Screen Doors. For wood framed screen doors, permissible woods and defects in wood, minimum mesh of wire cloth, standard thicknesses and tolerances for screen doors, standard construction.

Millwork Institute of California. Service Bulletin 32; 1928. Glossary of Terms and Standard Trade Practices. Includes doors of No. 1 quality of California pine and/or fir or Oregon pine, requirements on construction and permissible defects.

National Door Manufacturers Assn. Standard National Manufacturers List of Doors, Open Sash and Outside Blinds; 1926. Includes grading rules with permissible defects, sap, defective workmanship, etc., for 4 quality grades of doors and 2 quality grades of garage doors, finished thicknesses and permissible scantiness.

National Door Manufacturers Assn. Standard National Mfrs. List of Doors, Open Sash and Outside Blinds; 1926. Garage Doors. Definitions of 2 quality grades as regards permissible defects in material and in stiles and bottom rails.

Southern Sash, Door, and Millwork Mfrs. Assn. Official Grades; 1923. For doors, definitions of 4 quality grades, permissible defects, for through tenoned, blind tenoned, or doweled standard doors.

Southern Sash, Door, and Millwork Mfrs. Assn. Sash, Door, Blind, and General Millwork Catalog 3; 1919. Doors. Standard sizes and thicknesses of doors for various number and arrangement of panels, for ordinary doors, cupboard doors, bungalow and lattice doors, veneered panel and sash doors, garage doors, mirror and front doors, no dimensions of details.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS22–30; 1930. Builders' Hardware, Nontemplate. A commercial standard selected and accepted by industry. Recommends minimum width of door stiles, method of measuring stile width, definition of "French door," elimination of rabbets, minimum setback for door trim.

West Coast Lumbermens Assn. Grades for Architectural Woodwork; 1930. Doors. For exterior and interior walls and for cabinets, requirements on structural features for softwood and for hardwood doors, thickness limits, width limits on stiles and rails, for 2 quality grades, requirements on structural features of solid and of veneered stile and rail panel or glass doors, slab doors, and inside doors of the select grade.

References.—Millwork lumber. *See also* 411.4, 413.8. Metal doors and tin clad doors. *See* 605.22. Softwood and hardwood grading rules. *See* 400.2, 400.3, 413.0.

423.2 SASH

Millwork Institute of California. Architectural Woodwork; 1930. Screens and Screen Doors. For wood framed window and sash screens, porch screens, ventilator screens, and screen doors, permissible woods and defects in wood, minimum mesh of wire cloth, standard thicknesses and tolerances for screens, standard construction.

Millwork Institute of California. Architectural Woodwork; 1930. Windows and Sash. For windows, casements, cabinet and partition sash and other sash for exterior and interior wall or ceiling openings, permissible defects, permissible woods, standard thicknesses and tolerances, standard construction and assembly, sizes of tenons and dowels, thickness of veneer for plywood construction.

National Door Manufacturers Assn. Standard National Manufacturers List of Doors, Open Sash and Outside Blinds; 1926. Includes grading rules with permissible defects, sap, defective workmanship, etc., for check rail and plain rail windows and sash, finished thicknesses and permissible scantiness.

Southern Sash, Door, and Millwork Mfrs. Assn. Official Grades; 1923. For sash, permissible defects for 1 grade of check rail window and 1 grade of plain rail window and sash, permissible variation from list thickness for finishing.

Southern, Sash, Door, and Millwork Mfrs. Assn. Sash, Door, Blind, and General Millwork Catalog 3; 1919. Sash. List of standard sizes giving thickness of sash, number of lights, size of glass, and size of opening, for check rail windows, plain rail windows, casement sash, one-light sash, cupboard sash, cellar sash, barn sash, transoms, hot bed sash, front sash, bungalow windows, no dimensions of details.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS22–30; 1930. Builders' Hardware, Nontemplate. A commercial standard selected and accepted by industry. Defines "French window," recommends minimum width of stile, and standard mortises for turned wheel sash pulleys.

West Coast Lumbermens Assn. Grades for Architectural Woodwork; 1930. Sash. For Douglas fir or western red cedar, requirements on quality of wood and use of edge grain, structural features of sash, fitting and priming of sash and frames, for 2 quality grades.

References.—Millwork lumber. *See also* 411.4, 413.8. Steel windows. *See* 605.22. Softwood and hardwood grading rules. *See* 400.2, 400.3, 413.0. Definitions of terms, standard practice. *See* 423.0. Screen fasteners. *See* 617.43. Screen lifts. *See* 617.35. Hinges. *See* 617.12.

423.3 SLAT BLINDS

Millwork Institute of California. Architectural Woodwork; 1930. Blinds and Shutters. Permissible woods and defects in material, requirements on thickness of slats, thickness and laminated construction of panels, standard thicknesses of stile and rail type and of batten type, standard construction.

National Door Manufacturers Assn. Standard National Manufacturers List of Doors, Open Sash and Outside Blinds; 1926. Includes grading rules with permissible defects, sap, defective workmanship, etc., for 2 grades of outside blinds, finished thicknesses and permissible scantiness.

Southern Sash, Door, and Millwork Mfrs. Assn. Sash, Door, Blind and General Millwork Catalog 3; 1919. Blinds. List prices for outside blinds of 2 standard thicknesses and to fit various standard window openings, no dimensions of details.

Southern Sash, Door, and Millwork Mfrs. Assn. Official Grades; 1923. For blinds, permissible defects for one grade of outside blinds, permissible variation from list thickness for finishing.

West Coast Lumbermens Assn. Grades for Architectural Woodwork; 1930. Blinds and Shutters. For 2 quality grades, made from edge grain Douglas fir, western red cedar, or Port Orford cedar, requirements on structural features, use of water resistant glue, number of plies in panels, etc.

References.—Millwork lumber. *See also* 411.4, 413.8. Softwood and hardwood grading rules. *See* 400.2, 400.3, 413.0. Definitions of terms, standard practice. *See* 423.0.

423.4 SLATS

423.5 PICKETS AND PALINGS

Arkansas Soft Pine Bureau. Grades of Arkansas Soft Pine Lumber; 1929. Includes pickets, dimensions and finish requirements for square pickets and for flat pickets.

California Redwood Assn. Eastern Grades of California Redwood Lumber; 1927. Battens, Pickets, Porch Rail. Grading in accordance with Am. Lumber Standards, definition of 1 finish grade.

California Redwood Assn. Standard Patterns of Worked Redwood Lumber; 1917. For pickets, dimensions, and design of standard patterns, illustrated.

Pacific Lumber Inspection Bureau (Inc.). Schedule N; 1929. Export Grading Rules of Douglas Fir, Pacific Hemlock, Sitka Spruce, and Western Red Cedar Lumber. Grading rules for Douglas fir pickets for use in export trade, for domestic trade the grading rules of West Coast Lumbermens Assn. are used.

Southern Cypress Manufacturers Assn. Standard Grades and Classifications of Cypress; 1929. Pickets. Definitions of 2 quality grades as regards permissible defects, standard sizes and workings for 3 square sizes and 1 flat size.

Southern Pine Assn. Grades for Longleaf and Shortleaf Southern Pine Lumber; 1929. Pickets. For square pickets and flat pickets, dimensions and dressing requirements.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Pickets. Douglas fir and red cedar pickets, green or air dried, definition of 1 quality grade of each, standard sizes for square and flat pickets.

References.—Softwood and hardwood grading rules *See* 400.2, 400.3, 413.0. Definitions of terms, standard practice. *See* 423.0.

423.9 MISCELLANEOUS MILLWORK SPECIFICATIONS

Millwork Institute of California. Architectural Woodwork; 1930. Interior Jambs, Interior Jamb and Trim Assemblies, Cabinetwork, Panelings, Standardized Cabinets and Built-In Fixtures, Stairwork, and Exterior Frames. Requirements on quality of material and finish, standards of construction and assembly.

Southern Sash, Door, and Millwork Mfrs. Assn. Sash, Door, Blind, and General Millwork Catalog 3; 1919. Window Frames, Door Frames. For standard size frames, sectional dimensions of pieces making up frame and the outside trim, grade of yellow pine used.

West Coast Lumbermens Assn. Grades for Architectural Woodwork; 1930. For 2 grades of architectural woodwork of west coast woods, requirements on moisture content and quality of wood, permissible defects, species of wood acceptable for various classes of millwork, requirements on structural features, fitting, priming, weatherproofing, etc., for exterior frames, sash, doors, inside finish, cabinets, panelwork, stairs, exterior finish, blinds, shutters, and screens.

References.—Millwork lumber. *See also* 411.4, 413.8. Softwood and hardwood grading rules. *See* 400.2, 400.3, 413.0. Definitions of terms, standard practice. *See* 423.0.

424. TANKS

References.—Wood tanks. *See* 956.2. Metal tanks. *See* 605.23, 956.2.

425. MANUFACTURES OF CORK

425.1 CORK STOPPERS

425.2 CORK BOARD, COMPRESSED CORK

U. S. Gov., Federal Specifications Board. LLL–C–571; 1931. Compressed Cork (Corkboard). Corkboard intended for insulation, requirements on behavior and expansion in boiling test, weight of material, dimensions of blocks.

References.—Ground cork. *See* 414.1.

425.3 LIFE PRESERVERS, BELTS, AND BUOY RINGS OF CORK

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Life Preservers. For marine use, mandatory requirements for life preservers of compressed cork, balsa wood, or tule, or vest type, requirements on design, reversibility, length, buoyancy test, weight and stitching of cotton covering, strength of straps, weight of cork, weight and buoyancy test of kapok collar.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Ring Life Buoys. For solid cork buoys, mandatory requirements on minimum inside and outside diameters, buoyancy test, strength and sewing of cloth covering, size and attachment of manila line, gluing of cork layers and steaming test of joints.

References.—Ground cork, compressed cork. *See* 414.1, 425.2. Balsa wood life buoy. *See* 429.9.

425.4 CORK PIPE COVERINGS

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Pipe Covering. Sectional molded cork covering 1¼ inches thick, requirements for manufacture, type of jacket, application of covering to pipes and valves, for drinking or ice water supplies.

References.—Cork pipe covering. *See also* 707.41. Ground cork, compressed cork. *See* 414.1, 425.2.

426. VEHICLES

References.—Wagon stock. *See* 413.54. Locomotives. *See* 701.3, 721.1. Automobiles and trucks. *See* 721.2, 722, 723. Aircraft. *See* 724. Bicycles, motorcycles. *See* 725.1, 725.2. Boats, ships. *See* 725.3, 725.4. Railway cars. *See* 726. Trucks, other than motor trucks. *See* 729.3.

427. ELECTRICAL EQUIPMENT OF WOOD

American Electric Railway Engr. Assn. Recommended Specification. D102–29; 1929. Overhead Line Material for Direct and Catenary Suspension. Includes wooden switch boxes, general requirements on construction, painting, inclination of lead entrance holes, guarding of switch handles.

American Railway Assn. Signal Section 5728; 1928. Trunking and Capping. Wood trunking as conduit for insulated wire, finish, dimensions, quality requirements for lumber, permissible defects in white or norway pine, longleaf yellow pine, fir, cedar, cypress, and redwood.

American Railway Assn. Telegraph and Telephone Section. 1–C–3; 1928. Creosoted Wood Conduit. For conduit of southern yellow pine, norway pine, or black gum, permissible defects in wood, range in lengths of one size square conduit with circular bore, dimensions of tenons and mortises, required weight of preservative, method of creosoting according to A. R. A. spec. 1–A–10.

American Railway Assn. Telegraph and Telephone Section. 1–C–4; 1928. Creosoted Pine Plank. Plank for use in underground construction, southern yellow pine, permissible defects, dimension requirements, method of creosoting and creosote according to A. R. A. standard specifications.

National Electric Light Assn. Suggested Specifications. D180–24T; 1924. Ground Wire Molding (Material). D190–24T; 1924. Ground Wire Molding (Dimensions). For wood molding for protection of ground wire, of oak, chestnut, or rock elm, permissible amount of defects, dimensions and allowable variations. Published in 1924 N. E. L. A. proceedings.

Underwriters' Laboratories. Wooden Raceways for Surface Wiring; 1920. For electric circuits of 300 volts or less, for use in dry places, design, minimum thicknesses of walls, and finish requirements.

References—Wooden insulators and insulator pins. *See* 429.7. Wooden poles, crossarms. *See* 401.3, 402.1.

428. WOODEN HANDLES, OARS, AND PADDLES

428.1 HANDLES FOR AGRICULTURAL IMPLEMENTS

U. S. Gov., Dept. of Commerce. Bureau of Standards. R76; 1927. Ash Handles. Simplified practice recommended and accepted by industry defining 3 quality grades for fork, hoe, rake, and shovel handles, requirements on color, weight, texture, number of growth rings, straightness of grain, and permissible blemishes.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R77; 1927. Hickory Handles. Simplified practice recommended and accepted by industry defining 3 quality grades for handles 24 inches and longer and 3 grades for hammer and hatchet handles, requirements on general quality, number of annual rings, color, and permissible defects for each grade.

428.2 WOODEN HANDLES FOR TOOLS

428.20 General Items

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Tool Handles. List or recommended standard sizes of tool handles for axe, pick, maul, hammer, adze, and hatchet.

428.21 Broom, Mop, and Brush Handles

References.—Brooms and broom handles. *See* 981. Brushes and brush handles. *See* 982. Mopsticks. *See* 983.1.

428.22 Package Handles

428.29 Miscellaneous Tool Handles

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Track Tool Handles; 1929. Standard design and dimensions of handles for track chisels, spike mauls, sledges, axes, picks, and adzes, eye dimensions in accordance with simplified practice recommendations R17 of U. S. Bureau of Standards for forged tools.

U. S. Gov., Dept. of Commerce. Bureau of Standards. H5; 1923. Approved by American Standards Assn. as B 13–1924. American Logging and Sawmill Safety Code. Includes axe handles, requirements on general quality and grain of hickory handles, permissible defects, permissible variations from specified dimension, number of annual rings.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R77; 1927. Hickory Handles. Simplified practice recommended and accepted by industry defining 3 quality grades for handles 24 inches and longer and 3 grades for hammer and hatchet handles, requirements on general quality, number of annual rings, color, and permissible defects for each grade.

References.—Standard sizes. *See also* 428.20.

428.3 OARS AND PADDLES

429. MISCELLANEOUS MANUFACTURES OF WOOD

429.1 WOODENWARE (DISHES AND KITCHEN UTENSILS)

429.2 WOODEN TOOLS

References.—Metal hand tools. *See* 615, 616.

429.3 WOODEN POLE BRACKETS AND STEPS

References.—Steel brackets and steps. *See* 719.62.

429.4 WOODEN LADDERS

National Safety Council (American Society of Safety Engineers, Engineering Section). Approved by American Standards Assn. as A14–1923. Safety Code for the Construction, Care, and Use of Ladders. Requirements on permissible kinds and relative dimensions of wood for side rails and rungs, permissible defects in wood, test requirements for strength for portable and extension ladders, dimensions and construction of wooden and of metal ladders, fixed, portable, extension, fire, and step ladders, trolley ladders, sectional, and trestle ladders, installation and operation.

References.—Ladder stock. *See* 413.9. Construction of ladders for mines. *See* 751.

429.5 WOODEN ROLLERS

429.7 WOODEN INSULATORS AND INSULATOR PINS

American Electric Railway Engr. Assn. Recommended Specification. D102–29; 1929. Overhead Line Material for Direct and Catenary Suspension. Includes wood insulator pins and wood strain insulators. For feeder insulator pins and for oak (Western Union) bracket insulator pins, requirements on dimensions and permissible variations, wood according to spec. D150 of Nat. Elec. Light Assn. For strain insulators of hickory, requirements on impregnation, construction, dimensions and permissible variations, breaking strength, for four sizes.

National Electric Light Assn. Suggested Specifications. D150–23; 1923. Wood Insulator Pins (Material). D160–22; 1922. Wood Pin (Dimensions). For yellow or black locust pins, permissible amounts and location of defects, threading, dimensions, and permissible variations. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications. D991–28T; 1928. Tentative. 1-inch and 1⅜-inch Wood Pin Thread. For 4 threads per inch, detail dimensions of thread, allowable variations.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 248–227. Wood Strain Insulators. Requirements on general quality of hickory material, impregnation, and dimensions for various combinations of end connections of eye or clevis.

References.—Thread Gages for Insulator Pins. *See* 615.82.

429.8 WOODEN WHEELS

References.—Wood spoke automobile wheels. *See* 722.35. Wagon wheel stock. *See* 413.54.

429.9 MANUFACTURES OF WOOD NOT ELSEWHERE CLASSIFIED

Amateur Athletic Union of the U. S. Official Athletic Rules; 1931. (Publ. No. 117R of American Sports Publishing Co., 45 Rose St., New York, N. Y.) Ice Hockey. For wood sticks, requirements on shape, width, length of blade and of handle.

Amateur Athletic Union of the U. S. Specifications of Apparatus; 1931. (Publ. No. 117R of American Sports Publ. Co., 45 Rose St., N. Y.) Relay Baton. For hollow wood tube, standard length, weight and circumference.

Amateur Athletic Union of the U. S. Official Athletic Rules. (Publication No. 117R of American Sports Publishing Co., 45 Rose St., New York, N. Y.; 1931.) Springboard. Permissible minimum length and width, to be slightly elastic.

American Bowling Congress. Atlantic Coast Bowling Assn. Pacific Coast Bowling Assn. Rules and Regulations; 1929. (Publ. No. 49R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Pins. To be made of maple, requirements on design and dimensions, permissible variation in weight of pins in one set, weight limits.

American Foundrymen's Assn. Standard Pattern Colors; 1925. Wall chart showing standard colors of paint to be applied to patterns to indicate finished and unfinished surfaces, seats of loose pieces, core prints, and stop offs.

American Foundrymen's Assn. Tentative Recommended Practice; 1927. Joint Committee on Pattern Equipment Standardization. Marking gaged surfaces and locating points on patterns, indicating chilled surfaces and metal inserts, loose pieces, sizes of leather fillets and of core prints. Tentative standard design of vibrators for match plates.

American Physical Education Assn., National Section on Women's Athletics. Outdoor Baseball Rules for Girls and Women; 1930. (Publ. No. 121R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Bat. For round wood bat, permissible maximum diameter and length, no restrictions on weight or kind of wood.

American Railway Assn. Telegraph and Telephone Section. 1–A–30; 1929. Typical Wood Booth for Roadway Telephone. For exterior woodwork and trim of cypress and for interior woodwork of pine, with asphalt shingle roof, requirements on thickness of roof sheathing and flooring, dimensions of backboard and door, general design and dimensions of booth.

American Railway Assn. Telegraph and Telephone Section. 1–A–31; 1929. Telephone Shelter Box, Type A. For box of white pine, requirements on thickness and type of boards, grade of tin roofing, attachment and operating features of door, dimensions and design of box, mounting on post.

American Railway Engineering Assn. 1929 Manual. Tie Plugs; 1925. Wooden plugs for filling spike holes, 25 suitable varieties of wood, general quality, dimensions of 2 standard sizes.

Intercollegiate Assn. of Amateur Athletes of America. (Publ. No. 45R of American Sports Publ. Co., 45 Rose St., N. Y.) 1931. Relay Baton. For standard hollow wood tube, requirements on length, weight, and circumference.

Machinery Builders Society. Standard Method for Marking Patterns; 1926. Standard colors which parts of pattern are to be painted to indicate unfinished surfaces, machined surfaces, seats of loose pieces, core prints, and stop offs.

National Collegiate Athletic Assn. College Baseball Rules. 1930. (Publ. No. 130R of American Sports Publ. Co., 45 Rose St., N. Y.) Bat. Standards as given are the same as those of National League and American League of Professional Base Ball Clubs.

National Collegiate Athletic Assn. Ice Hockey Rules; 1930. (Publ. No. 92R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Sticks. To be of wood, permissible maximum width, length, and length of blade.

National Collegiate Athletic Assn. Swimming Rules; 1930. (Publ. No. 91R of American Sports Publ. Co., 45 Rose St., N. Y.) Springboard. Standard length and width with recommended design and construction of pipe supports.

National Collegiate Athletic Assn. Track and Field Rules; 1930. (Publ. No. 112R of American Sports Publ. Co., 45 Rose St., N. Y.) Relay Baton. For wooden baton, requirements on length, weight, and circumference.

National Hockey League. Laws of Hockey; 1929. (Publ. No. 90R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Hockey Stick. To be of wood, permissible length, length of blade, height of blade for regular stick and for goal keepers stick.

National Indoor Baseball Assn. of U. S. Hancock's Indoor Baseball Rules as revised and adopted by N. I. B. A. U. S.; 1930. (Publ. Group 1. No. 12R of American Sports Publ. Co., 45 Rose St., N. Y.) Bat. For wood bat, requirements on length, permissible maximum diameter, provision of rubber tip on handle, may be loaded with metal rod.

National League of Professional Base Ball Clubs. American League of Professional Base Ball Clubs. National Assn. of Professional Base Ball Leagues. Official Base Ball Rules; 1930. (Publ. No. 100X of American Sports Publ. Co., 45 Rose St., N. Y.) Bat. To be round of hard wood construction, permissible maximum diameter and length, permissible winding of twine on handle.

Playground and Recreation Assn. of America. Official Rules of Playground Base Ball; 1930. (Publ. Group 1. No. 12R of American Sports Publ. Co., 45 Rose St., N. Y.) Bat. For wood bat, permissible maximum diameter and length.

Steel Founders Society of America. Standard Trade Customs in the Steel Foundry Industry. Undated. Includes standard painting practice for patterns for machined and unfinished surfaces, seats of loose pieces, core prints, etc., using solid and striped colors.

U. S. Field Hockey Assn. and American Physical Education Assn. Official Field Hockey Rules; 1931. (Publ. No. 38R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Sticks. Requirements on location of flat face, disallowance of inserts or fittings, stick to pass through 2-inch ring, rounding of edges, permissible maximum weight.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS18–29; 1929 Hickory Golf Shafts. A commercial standard selected and accepted by industry for "B" form shafts for iron-headed clubs, including requirements on general quality of wood, permissible moisture content, dimensions and tolerances, straightness, straightness of grain, stiffness requirement for each of 3 grades, test method.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS19–30; 1930. Foundry Patterns of Wood. Pattern colors selected and accepted by industry as a commercial standard covering colors for unfinished surfaces, machined surfaces, core prints, etc. Same as standard pattern colors sponsored by American Foundrymen's Assn. and other organizations.

U. S. Gov., Dept. of Commerce. Bureau of Standards. H5; 1923. Approved by American Standards Assn. as B 13–1924. American Logging and Sawmill Safety Code. For flume construction, permissible maximum spacing of supporting posts, minimum size of posts, minimum size of runway, requirements on material of runway and provision of handrail.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Ring Life Buoy. For balsa wood buoy, mandatory requirements on construction, minimum outside and inside diameters, buoyancy test, strength and sewing of cloth covering, size and attachment of manila line.

West Coast Lumbermens Assn. Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock, and Western Red Cedar Lumber; 1929. Well Tubing. For Douglas fir well tubing, dressed and matched, green or air dried, definition of 1 quality grade, permissible defects.

References.—Turpentine. *See* 211.1. Rosin. *See* 216. Softwood grading rules, hardwood grading rules. *See* 400.2, 400.3. Battery cases, wooden. *See* 954.29. Wooden dummy plug for telephone switchboards. *See* 718.29. Medicine chest, wood. *See* 915.43. Fire hose racks, wood. *See* 974.3. Brooms, brushes, mops. *See* 981, 982, 983. Matches. *See* 991. Wooden seats for water closet bowls. *See* 532.23.

430–439 FURNITURE OF WOOD

431. HOUSEHOLD FURNITURE, EXCEPT CHAIRS

431.1 BEDROOM FURNITURE OF WOOD

431.11 Wooden Beds

U. S. Gov., Dept. of Commerce. Bureau of Standards. R2–30; 1930. Bedsteads, Springs, and Mattresses. For wooden beds, simplified practice recommended and accepted by industry establishing a limited list of standard sizes with width and length dimensions for full and single sizes of beds and coil spring and metal fabric bedsprings.

References.—Veneer, plywood, and other furniture stock. *See* 413.52, 413.53. Metal beds. *See* 613.1.

431.12 Bureaus and Chiffoniers

References.—Plate glass mirrors. *See* 527.

431.13 Cots

U. S. Gov., Federal Specifications Board. 240; 1924. Folding Canvas Cot. Descriptive construction of rock elm, beech, or hard maple wooden folding frame, of sheet steel fittings and of rivets, dipping requirements, construction of canvas cover, size of thread, thread count, tensile strength of fabric requirements, construction of web binding straps and of handle. Cover of unbleached duck or standard khaki duck.

References.—Metal frame cots. *See* 613.1.

431.14 Wardrobes

431.2 NURSERY FURNITURE OF WOOD

431.3 BATHROOM FURNITURE OF WOOD

References.—Plate glass mirrors. *See* 527.

431.4 DINING-ROOM FURNITURE

References.—Plate glass mirrors. *See* 527.

431.5 KITCHEN FURNITURE

431.51 Kitchen Tables

431.52 Refrigerators

References.—Refrigerators. *See* 959.4.

431.6 LIBRARY FURNITURE OF WOOD

431.61 Wooden Bookcases

431.9 MISCELLANEOUS HOUSEHOLD FURNITURE OF WOOD

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 325–011. Radio Receiver Cabinet. Requirements on standard sizes of B-battery compartments.

References.—Chairs. *See* 438., 435.2. Plate glass mirrors. *See* 527.

432. LAWN AND PORCH FURNITURE

433. CAMP FURNITURE

433.1 FOLDING CAMP COTS

References.—Folding canvas cot. *See* 431.13.

434. HOSPITAL FURNITURE OF WOOD

References.—Metal hospital beds and cots. *See* 613.1.

435. OFFICE FURNITURE OF WOOD

435.1 WOODEN BOOKCASES

References.—Bookcase sections. *See* 435.5.

435.2 WOODEN OFFICE CHAIRS AND STOOLS

U. S. Gov., Federal Specifications Board. 409; 1926. Office Chairs. For rotary arm chair, leg arm chair, rotary and leg chairs without arms, rotary chair, judge's rotary chair, rotary stool with and without back, and rotary typewriter chair, requirements on construction of chairs with wood slat backs and wood saddle type seats using quartered white oak or mahogany, or birch to match mahogany, excepting judge's chair having leather upholstered back and seat, requirements on dimensions and materials of castors, type of spiders, dimensions and structural features, finish, color conforming to standard colors of General Supply Committee.

435.3 DESKS AND OFFICE TABLES, WOODEN

U. S. Gov., Federal Specifications Board. 478; 1927. Wood Tables and Stands. For office tables and stands of quartered white oak, mahogany, or birch to match office desks, commercial sizes, heights, construction of tops, legs, and drawers, and finish requirements.

U. S. Gov., Federal Specifications Board. AA–D–201; 1930. Wood Desks. For flat top single and double desks, roll top desks, and typewriter desks with flat top, drop at center, drop at either side, and typewriter compartment in either pedestal, types, requirements on height and sizes, general quality of oak, mahogany, and birch woods, size and construction of legs, number of ply and construction of panels, tops, decks, slides, drawers, thickness of tops, amount and type of hardware, finish, color.

References.—Veneer, plywood, and other furniture stock. *See* 413.52, 413.53. Metal desks and tables. *See* 613.4, 613.6. Desk locks. *See* 617.21.

435.4 WOODEN DOCUMENT BOXES

435.5 WOODEN FILING CASES AND CABINETS

American Railway Assn. Telegraph and Telephone Section. 2–G–44; 1929. Stationery Holder. For box type of holder of oak with horizontal shelves, requirements on dimensions, design, and finish, method of mounting on telegraph table.

U. S. Gov., Federal Specifications Board. 359a; 1927. Wood Office Sectional Furniture, Cabinets and Trays. Includes small sections, upright sections, bookcase sections, tray and cabinets, card filing, the sectional devices to intermember with and match in size, appearance, and finish the standard sections adopted by General Supply Committee, requirements on general quality and kinds of wood, construction, number of ply, types of joint, etc., for framing, backs, tops, panels, drawers, drawer suspensions, dimensions of upright sections and bookcase sections, kinds of hardware, finish.

References.—Veneer, plywood, and other furniture stock. *See* 413.52, 413.53. Steel filing cases. *See* 613.7.

435.6 WASTE PAPER BASKETS

436. STORE FURNITURE AND FIXTURES, WOODEN

437. CHURCH, SCHOOL, AND THEATER FURNITURE, WOODEN

U. S. Gov., Dept. of Commerce. Bureau of Standards. R111–30; 1930. Color for School Furniture. Simplified practice recommended and accepted by industry for use of School Furniture Brown as the standard color for stock varieties of school furniture, such as desks, seats, chairs, tables, filing cabinets, bookcases and laboratory furniture, color block included showing the standard color. Applicable to wooden furniture.

438. WOODEN CHAIRS

438.0 GENERAL ITEMS

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circular No. 1; 1922. Porch Rocking Chairs. Circular No. 8; 1923. Wooden Chairs. Requirements for packing in bundles with or without paper wrapping dependent on value; weight, mullen test, and size of paper for wrapper.

American Railway Assn. Freight Container Bureau. Bulletin No. 3; 1926. Bundling and Tying of Chairs When not Crated. Illustrations of recommended practice in bundling and tying for shipment.

438.1 DINING-ROOM CHAIRS

438.2 WOODEN OFFICE CHAIRS

References.—Office chairs. *See* 435.2. Packing of chairs. *See* 438.0.

438.3 FOLDING CHAIRS AND CAMP STOOLS

U. S. Gov., Dept. of Commerce. Bureau of Standards. R80–28; 1928. Folding and Portable Wooden Chairs. Simplified practice recommended and accepted by industry establishing 3 standard types of each of folding chair and of portable assembly chair, with 1 finish for each, description of construction of each type, definitions of single folding chair and portable assembly chair.

References.—Packing of chairs. *See* 438.0.

438.4 WHEEL CHAIRS

439. MISCELLANEOUS FURNITURE EXCEPT METAL FURNITURE

439.1 BAMBOO, RATTAN, AND REED FURNITURE, EXCEPT CHAIRS

439.2 SCREENS

470–479

PAPER

(Except printed matter)

470. GENERAL ITEMS

470.1 DEFINITIONS AND CLASSIFICATION OF PAPER

American Paper and Pulp Assn. Committee on Classification of Papers. Classification and Definitions of Paper; 1928. A committee report covering a classification of paper and paper board based on the method of manufacture and a comprehensive list of generally accepted definitions of the various types and kinds of paper and paper boards.

National Assn. of Waste Material Dealers (Inc.). Waste Paper Classification; 1922. Definitions of 10 classes.

Rag Content Paper Mfrs. Definition of Rag Content Paper; 1931. Requires a minimum of 25 per cent of rag content.

References.—Wood pulp. *See* 400.50. Lime for use in manufacture of paper. *See* 517.2.

470.2 SIZES OF PAPER

U. S. Gov., Dept. of Commerce. Bureau of Standards. R22; 1924. Paper. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes of paper and their doubles, covering stock sizes for general printing and publishing, for book publishers, and for forms and letterheads.

470.3 TESTS OF PAPER

Abrasive Paper and Cloth Manufacturers Exchange. Abrasive Coated Products; 1929. Includes method of test for weight and tensile strength of rope paper.

American Railway Assn. Mechanical Div. Recommended Practice. Porosity Testing Apparatus; 1927. Dimensions and design of test device for testing porosity of paper, illustrated.

Technical Assn. of Pulp and Paper Industry. Paper Testing Methods; 1928. Chemical Analysis. Includes official methods for analysis of mineral filler in paper, for analysis of mineral coating, for qualitative determination of casein, rosin, nitrogenous proteinaceous material, starch, and active sulphur in paper, and for the quantitative determination of moisture, ash, amount of mineral coating, resin, proteinaceous nitrogen, starch, and of paraffin in paraffined paper. Unofficial methods for determination of coloring matter, amount of free acid, and tests for special materials.

Technical Assn. of the Pulp and Paper Industry. Paper Testing Methods; 1928. Includes microscopical examination methods. Official method for determination of fiber composition, description of apparatus, preparation of stains, procedure, also the tentative dot method is described. Includes a classification of papermaking fibers with photomicrographs of several and identification of specks and dirt in paper.

Technical Assn. of the Pulp and Paper Industry. Paper Testing Methods; 1928. Physical Testing Methods. Includes official conditioning method for test specimens and required relative humidity and temperature of atmosphere at time of test, also official methods for determination of machine direction of paper, weight of paper, bursting strength, thickness, folding endurance, tensile breaking strength, tearing strength, opacity, and gloss, descriptions and specifications of test apparatus with required degree of accuracy. Also includes descriptions of tests and apparatus for nonofficial methods for testing resistance to wet rub, porosity, degree of sizing, water resistance, grease resistance, absorption, volumetric composition, presence of conducting particles, retention of filler, expansion and contraction of paper.

Technical Assn. of the Pulp and Paper Industry. Paper Testing Methods; 1928. Includes official method of sampling paper for testing. Requirements on minimum size of sheets and total area of test specimen, on percentage of lot to be sampled, and on method of sampling from rolls, cases, frames, and bundles.

Technical Assn. of Pulp and Paper Industry. Proposed Standard Test Conditions for Determining the Initial Strength of Pulp; 1927. Requirements on preparation of pulp, making of test sheet, pressing and drying, atmospheric conditions during testing of sheets.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Methods of Inspection and Tests. Covers prescribed methods for sampling, fiber analysis, determination of ash, acidity, sizing, weight, folding endurance, bursting and tensile strength, thickness, opacity, absorption, and water resistance.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C107; 1921. Testing of Paper. Gives methods of testing and describes apparatus used at bureau in the routine testing of paper, with schedule of fees for making tests. Covers determination of weight, thickness, bursting and tensile strengths, folding endurance, tearing strength, absorption, transparency, chemical determination of loading material, sizing, and microscopical testing.

U. S. Gov., Dept. of Commerce. Bureau of Standards. T250; 1924. Pulp and Paper Fiber Composition Standards. Colored charts as reference standards, showing the color reactions of common paper-making fibers and standard fiber mixtures with various stains for use in identification and estimation of fiber composition of paper, method of preparing the stains used.

U. S. Gov., Dept. of Commerce. Bureau of Standards. T326; 1926. Measurement of Degree of Sizing of Paper. Describes and compares several methods of testing sizing including the Bureau of Standards dry-indicator method and the curl method.

U. S. Gov., Federal Specifications Board. 394; 1926. Paper. Definitions of "tub sized with animal glue" and "air dried," packing requirements, methods of sampling and test, standard atmospheric conditions, fiber analysis, tests for ash, weight, bursting strength, thickness, folding endurance, animal glue sizing tests, and starch sizing qualitative test.

References.—Tests of electrical insulating paper. *See* 719.50, 719.52.

471. ABSORBENT PAPER

471.1 BLOTTING PAPER

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Blotting Paper, White and Colored. (Lots 354, 355.) For 1 weight and sheet size, requirements on ash, bursting strength, absorption, freedom from ground wood pulp stock, and test methods, with color and finish according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Desk Blotting Paper, Colored. (Lots 358, 359.) For 1 weight and sheet size, requirements on ash, bursting strength, freedom from ground wood pulp stock, and test methods, with color and finish according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 25 per cent Rag Blotting Paper, White and Colored. For 1 weight and sheet size, requirements on ash, bursting strength, absorption, freedom from ground wood pulp, test methods, and with color and finish according to sample.

References.—Methods of testing. *See also* 470.3. Definitions and classification. *See* 470.1.

471.2 FILTER PAPER

American Chemical Society. Standard Sizes and Shapes of Apparatus; 1927. Includes filter paper, sizes selected as standard for stock.

References.—Definitions. *See* 470.1.

471.3 PAPER TOWELING

U. S. Gov., Dept. of Commerce. Bureau of Standards. C294; 1925. Standards for Paper Towels. Includes recommended specifications with requirements on weight, absorbency, and bursting strength, and recommended methods of testing quality.

References.—Methods of testing. *See* 470.3. Definitions and classification. *See* 470.1.

471.9 MISCELLANEOUS ABSORBENT PAPER

References.—Stereotype molding paper. *See* 479.4.

472. PAPER BOARDS

472.0 GENERAL ITEMS

Paperboard Industries Assn. Gage Lists; 1928. Lists of standard thicknesses of various boards in conformity with Simplified Practice Recommendation No. 44, promulgated by U. S. Dept. of Commerce.

Paperboard Industries Assn. Standards; 1928. Includes definitions covering basis of regular sizes, standard package, bundle, regular number, procedure for determining count and number, basis of gage lists, and 8 gage lists for various boards.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R44; 1925. Box Board Thicknesses. Simplified practice recommended and accepted by industry establishing a list of standard thicknesses for various weights and finishes for nonbending boards, bending boards, solid news and solid wood pulp board, pasted chip board, container board, patent coated, and double manila wood pulp filled board.

472.1 COMBINATION BOARD (Nonhomogeneous, one operation)

472.11 Chip Board (jute-lined, manila-lined, news vatlined)

References.—Definitions and classification. *See* 470.1.

472.12 Manila Board (clay coated, patent coated)

References.—Definitions and classification. *See* 470.1.

472.13 News Board (manila-lined, patent coated)

References.—Newsboard as binders board. *See also* 472.32. Definitions and classification. *See* 470.1.

472.14 Pulp Board

References.—Pulp board for boxes. *See* 953.2. Fillers and flats of pulpboard for egg cases. *See* 953.36. Definitions and classification. *See* 470.1.

472.15 Strawboard (jute-lined, manila-lined, vat-lined)

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Binders Board—Lined Strawboard. (Lot 405.) For 1 weight and sheet size, requirements on bursting strength, thickness, and test methods, with surface and appearance according to sample.

References.—Standard sizes, methods of testing. *See also* 472.0, 470.3. Strawboard for boxes. *See also* 953.2. Definitions and classification. *See* 470.1.

472.16 Boxboard, Lined

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Binders Board—Lined Boxboard. (Lot 406.) For 1 weight and sheet size, lined on one side, requirements on bursting strength, thickness, and test methods, with surface and appearance according to sample.

References.—Standard sizes, methods of testing. *See also* 472.0, 470.3. Definitions and classification. *See* 470.1. Corrugated strawboard. *See* 472.25.

472.19 Miscellaneous Lined Boards

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Binders Board—Marble Grained Lined Board. (Lot 403.) For 1 weight and sheet size, requirements on bursting strength, thickness and test methods, with surface and appearance according to sample.

References.—Standard sizes, methods of testing. *See also* 472.0, 470.3. Definitions and classification. *See* 470.1.

472.2 PASTED BOARD (Two operations)

472.21 Pasted Chip Board

References.—Definitions and classification. *See* 470.1.

472.22 Sheet-lined Chip Board

References.—Definitions and classification. *See* 470.1.

472.23 Sheet-lined Straw Board

References.—Definitions and classification. *See* 470.1.

472.24 Wall Board

References.—Definitions and classification. *See* 470.1.

472.25 Corrugated Strawboard

American Railway Assn. Freight Container Bureau. Tentative Specification. Circular No. 11; 1923. Corrugated Strawboard Boxes for Boots and Shoes. Includes double faced or double walled corrugated boxboard, weight of facings, waterproof test requirements for facings, composition, weight, minimum thickness of strawboard, composition of silicate of soda for cement, construction of corrugated boxboard, minimum thicknesses and Mullen test requirements of built-up board.

References.—Standard sizes, methods of testing. *See also* 472.0, 470.3. Strawboard for boxes. *See also* 953.2. Definitions and classification. *See* 470.1.

472.3 SOLID BOARD (Homogeneous, one operation)

472.31 Chip Board (Plain, tack board, test)

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for

Gov. Print. Off. and Depts. Binders Board—Chip Board. (Lot 402.) For 1 weight and 5 sheet sizes, requirements on bursting strength, thickness, and test methods, with surface and appearance according to sample.

References.—Standard sizes, methods of testing. *See also* 472.0, 470.3. Definitions and classification. *See* 470.1.

472.32 Binders Board

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Binders Board, Hard Rolled, Best Quality. (Lot 408.) For 7 weights and 2 sheet sizes, requirements on bursting strength, thickness, density, and test methods, with water resistance, springiness, firmness, and appearance according to sample.

U. S., Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Binders Board, Hard Rolled, No. 2 Quality. (Lot 407.) For 6 weights and 1 sheet size, requirements on bursting strength, thickness, density, and methods of test, with water resistance, springiness, firmness, and appearance according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Binders Board—Chip Board. (Lot 402.) For 1 weight and 5 sheet sizes, requirements on bursting strength, thickness, and test methods, with surface and appearance according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Binders Board—Newsboard. (Lot 401.) For 1 weight and sheet size, requirements on bursting strength, thickness, and test methods, with surface and appearance according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Binders Board—Strawboard. (Lot 404.) For 1 weight and sheet size, requirements on bursting strength, thickness, and test methods, with surface and appearance according to sample.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R81–28; 1928. Binder's Board. Simplified practice recommended and accepted by industry establishing 10 sizes of binder's board as standard for stock purposes.

References.—Lined strawboard, binders board. *See* 472.15. Lined boxboard, binders board. *See* 472.16. Marble grained lined board, binders board. *See* 472.19. Standard sizes and thicknesses. *See* 472.0. Methods of testing. *See also* 470.3. Definitions and classification. *See* 470.1.

472.33 Friction Board

References.—Definitions and classification. *See* 470.1.

472.34 Jute Board

References.—Definitions and classification. *See* 470.1. Jute tag board. *See* 474.5.

472.35 Leather Board

References.—Definitions and classification. *See* 470.1.

472.36 Pressboard

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Pressboard, Red and Gray. (Lots 365, 366.) For 1 weight and sheet size of each, requirements on bursting strength and thickness, test methods, and with texture, surface, and color according to sample.

References.—Standard sizes, methods of testing. *See* 473.0, 470.3. Definitions and classification. *See* 470.1.

472.37 Pulp Board

References.—Pulpboard for boxes. *See* 953.2. Fillers and flats of pulpboard for egg cases. *See* 953.36. Definitions and classification. *See* 470.1.

472.38 Strawboard

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Binders Board—Strawboard. (Lot 404.) For 1 weight and sheet size, requirements on bursting strength, thickness, and test methods, with surface and appearance according to sample.

References.—Standard sizes, methods of testing. *See also* 472.0, 470.3. Corrugated strawboard. *See* 472.25. Lined strawboard. *See* 472.15. Strawboard for boxes. *See also* 953.2. Fillers and flats of strawboard for egg cases. *See* 953.36. Definitions and classification. *See* 470.1.

472.9 MISCELLANEOUS BOARDS

472.91 Fish Paper

References.—Electrical insulating fiber and paper. *See* 719.52. Definitions and classification. *See* 470.1.

472.92 Fuller Board

References.—Electrical insulating fiber and paper. *See* 719.52. Definitions and classification. *See* 470.1.

472.93 Fiber Board

Paperboard Industries Assn. Standards; 1928. Test Container Board Standards. For double fibre or double kraft board, 3 or more ply, standard thicknesses, weight, bursting strength, moisture, bending test and waterproofing test requirements.

References.—Hard fiber and vulcanized fiber electrical insulation. *See* 719.52. Fiber sheet packing for pipe joints. *See* 707.28. Standard sizes and thicknesses. *See* 472.0. Methods of testing. *See also* 470.3. Definitions and classification. *See* 470.1. Fiber board for boxes. *See* also 953.2.

472.94 Mill Board

References.—Asbestos millboard. *See* 545.2. Definitions and classification. *See* 470.1.

472.95 Illustrating Board

U. S. Gov., Federal Specifications Board. UU–B–591; 1931. Illustrating Board. For rough surface board for pencil and water-color work, and for smooth surface board for pen-and-ink work, test requirements for application of water colors and of drawing ink to the respective types on the original surfaces and on erased surfaces.

References.—Standard sizes and thicknesses. *See* 472.0. Definitions and classification. *See* 470.1.

473. BUILDING PAPER

473.1 ASBESTOS PAPER

References.—Asbestos paper and millboard. *See* 545.2. Definitions and classification. *See* 470.1.

473.2 FELTS (Carpet lining, deadening, saturating)

American Society for Testing Materials. Tentative Methods. D 272–29T; 1929. Methods of Analysis of Roofing Felt for Fiber Composition. Sampling procedure, requirements for microscope, graticule, dropper, preparation of Herzberg stain, preparation of sample and test procedure by fiber count method.

Asphalt Shingle and Roofing Institute. Dry Felt Tests; 1921. Sampling, test procedure for measuring weight, thickness, moisture content, tensile strength, pliability, ash, fibers present by means of microscope and stains, counting of fibers.

Asphalt Shingle and Roofing Institute. Recommended Test. Test to Determine the Speed with Which Felt Will Saturate; 1923. Test procedure for measuring the absorption of xylol by capillarity.

Asphalt Shingle and Roofing Institute. Recommended Tests. Test to Ascertain the Thoroughness with Which Felt Will Saturate; 1922. Test procedure for drying samples and saturating with kerosene.

References.—Hair felt, wool felt, cotton felt, rag felt. *See* 365.98. Roofing felts and roofing. *See* 505.16, 505.36. Definitions and classification. *See* 470.1.

473.3 THERMAL INSULATING PAPER AND FIBER

American Railway Assn. Mechanical Division. Recommended Practice; 1917. Paper, Insulation for Refrigerator Cars. Fibrous material saturated with asphaltum bitumen. Porosity, Mullen strength test, bending test and ash requirements for sample before exposure and for samples after exposure to high saturated temperature, drawing of porosity test apparatus.

References.—Methods of testing. *See also* 470.3. Definitions and classification. *See* 470.1.

473.4 SHEATHING (Waterproof, white fiber)

References.—Definitions and classification. *See* 470.1.

474. CARDBOARD

474.1 BLANKS

474.11 Nonpasted Blanks

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Railroad Board, White and Colored. (Lots 302 to 305 incl.) For 1 sheet size in 4, 8, and 14 ply board, requirements on thickness, on coating of facing sheets, with color and finish according to sample.

References.—Methods of testing. *See also* 470.3. Definitions and classification. *See* 470.1.

474.12 Pasted Blanks

References.—Definitions and classification. *See* 470.1.

474.2 INDEX BRISTOLS

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 50 per cent Rag Index Paper, White and Colored, Single Ply. (Lots 190 to 193.) For 4 weights and various sheet sizes, requirements on ash, bursting strength, thickness, freedom from ground wood pulp, writing and erasing qualities, and test methods, with color and finish in accordance with sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 100 per cent Rag Index Paper, White and Cream, Single Ply, Tub Sized, Air Dried. (Lot 196.) For permanent records, 1 weight and 2 sheet sizes, requirements on ash, acidity, sizing, bursting strength, thickness, writing and erasing qualities, and test methods, with color and finish according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committete on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Sulphite Index Paper, White and Colored, Single Ply. (Lots 184 to 187.) For 4 weights and 3 sheet sizes, of 100 per cent chemical wood pulp, requirements on ash, bursting strength, thickness, writing and erasing qualities, and test methods, with color and finish in accordance with sample.

References.—Methods of testing. *See also* 470.3. Definitions and classifications. *See* 470.1.

474.3 MILL BRISTOLS (Folders, tags)

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committete on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Manila Cardboard. (Lot 301.) For 1 weight and 3 sheet sizes, requirements on bursting strength, thickness, and test methods, with color and finish according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committete on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. U. S. Postal Card Bristol. (Lot 311.) For 1 weight and size of roll, requirements on ash, moisture content, freedom from ground wood pulp, bursting strength, thickness, color, finish, formation, and test methods.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committete on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Wood Bristol Board, Colored. (Lots 306 to 310 incl.) For 2 weights, 2 roll sizes, and 3 sheet sizes, requirements on bursting strength, thickness, surface and test methods, with color and finish according to sample.

References.—Methods of testing. *See also* 470.3. Definitions and classifications. *See* 470.1.

474.4 WEDDING BRISTOLS

References.—Definitions and classification. *See* 470.1.

474.5 TAG BOARDS

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 6, section 2. Shipping Tags. For tagboard tags of rope, jute, or sulphite fibre stocks, requirements on thickness and resistance by Cady or Mullen test, with paper patch reinforcement.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committete on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Calendered Tag Board, Manila and Colored. (Lots 224, 225.) For use on tabulating machines. For 1 weight and 2 roll sizes, requirements on 100 per cent chemical wood pulp stock, ash, bursting strength, thickness, and test methods, with color and finish according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committete on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. High Finish Sulphite Manila Tag Board. (Lot 221.) For 4 weights, stock of 100 per cent chemical wood pulp, requirements on sheet width limits, bursting strength and test methods, with color and finish according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty first Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Jute Tag Board. (Lot 227.) For 3 weights, stock of 50 per cent manila and (or) jute pulp and 50 per cent chemical wood pulp, requirements on bursting strength and test methods with color and finish according to sample.

References.—Methods of testing. *See also* 470.3. Definitions and classification. *See* 470.1. Plate wiping paper (tag board). *See* 479.4.

474.9 MISCELLANEOUS CARDBOARDS

References.—Bristol drawing board and paper. *See* 478.32.

475. COVER PAPER, NEWS PAPER, AND PRINTING PAPER

475.1 COATED COVER PAPER

Cover Paper Manufacturers Assn. Trade Customs; 1931. Includes list of standard sizes and substances of cover paper.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Coated Cover Paper, Colored. (Lot 201.) For 1 sheet size and weight, requirements on ash, bursting strength, coating and surface, freedom from ground wood pulp, and test methods, with color and finish according to sample, suitable for halftones.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classifications. *See* 470.1.

475.2 PASTED COVER PAPER

Cover Paper Manufacturers Assn. Trade Customs; 1931. Includes list of standard sizes and substances of cover paper.

References.—Definitions, classification, methods of test. *See* 470.1, 470.3.

475.3 UNCOATED COVER PAPER

Cover Paper Manufacturers Assn. Trade Customs; 1931. Includes list of standard sizes and substances of cover paper.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 50 per cent Rag Antique Cover Paper, Colored. (Lot 206.) For 1 weight and sheet size, requirements on ash, bursting strength, freedom from ground wood pulp, and test methods, with color and finish according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 50 per cent Rag Laid Cover Paper, Colored. (Lot 205.) For 1 weight and 2 sheet sizes, requirements on ash, bursting strength, freedom from ground wood pulp, and test methods.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 25 per cent Rag Machine Finish Cover Paper, Colored. (Lots 203, 204.) For 1 weight and 2 sheet sizes of antique finish and of smooth finish, requirements on ash, bursting strength, freedom from ground wood pulp, and test methods, with color and finish in accord with sample.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

475.4 HANGING PAPER (NEWS), WALLPAPER

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS16–29; 1929. Wall Paper. A commercial standard selected and accepted by industry covering widths of stock and pattern, length of roll and coverage, 3 standard weights, color fastness and grounding requirements for printed, plain, and embossed papers, widths, lengths, coverage, quality of raw stock, 4 standard weights for varnished tiles and engraved papers.

Wallpaper Assn. of the U. S. Trade Regulations Undated. Standard lengths of roll and standard paper weights for wallpaper, permissible variations.

References.—Definitions and classification, methods of test. *See* 470.1, 470.3.

475.5 NEWSPRINT

News Print Service Bureau. Standard News Print Paper; 1923. Definition of news print paper, including its general composition, method of manufacture, and approximate weight.

U. S. Gov., Congress. Joint Committee on Printing. Twenty-First Report of the Committee on Paper Specifications; 1929. Recommended schedule for the public printing and binding and blank paper for use of the Government depts. Standard Newsprint, lot 1. Test requirements for weight, tensile strength, thickness, and opacity, color, finish, formation, and cleanliness according to standard samples at Gov. printing office, for 3 roll widths.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See also* 470.1.

475.6 COATED PRINTING PAPER

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Double Coated Book. Lot 36. For 3 sizes, requirements on freedom from ground-wood pulp, ash, weight, folding endurance, bursting strength, thickness, coating and surface, test methods, color, finish, etc., in accordance with standard samples.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 50 Per Cent Rag Double Coated Book. Lot 37. For 5 sizes, requirements on freedom from ground-wood pulp, ash, weight, folding endurance, bursting strength, thickness, coating and surface, test methods, color, finish, etc., in accord with standard samples.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Single Coated Book. Lot 35. For 3 sizes, recommendations on freedom from ground-wood pulp, ash, weight, folding endurance, bursting strength, thickness, coating and surface, test methods, color, finish, etc., in accord with standard samples.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

475.7 UNCOATED PRINTING PAPER

References.—Newsprint. *See* 475.5. Definitions and classification. *See* 470.1.

475.71 Bible Paper

References.—Definitions and classification. *See* 470.1.

475.72 Book Paper

U. S. Gov., Congress. Joint Committee on Printing. Twenty-First Report of the Committee on Paper Specifications; 1929. Recommended schedule for the public printing and binding and blank paper for use of the Gov. Depts. Machine-Finish Book. Lots 3 to 14. For stock free from unbleached or ground-wood pulp, test requirements for ash, weight, bursting strength, thickness, opacity, for 5 weight classes, color, finish, formation and cleanliness in accordance with standard samples at Gov. Printing Office, weight and cut or roll dimensions for each lot.

U. S. Gov., Congress. Joint Committee on Printing. Twenty-First Report of the Committee on Paper Specifications; 1929. Recommended schedule for the public printing and binding and for use of Gov. Depts. Machine-Finish Book. Lot 15. For use on monotype machines, requirements on freedom of stock from unbleached or ground wood pulp, on tests for ash, weight, bursting strength, and thickness, color, finish, etc., according to standard sample at Gov. Printing Office, width of roll.

U. S. Gov., Congress. Joint Committee on Printing. Twenty-First Report of Committee on Paper Specifications; 1929. Recommended schedule for the public printing and binding and for use of Gov. Depts. Machine-Finish Book End Paper. Lot 17. Requirements on freedom of stock from unbleached or ground-wood pulp, on dimensions of flat sheets, test requirements for ash, weight, bursting strength, and thickness, color, finish, etc., in accord with standard samples at Gov. Print. Off.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Printing Off. and Depts. Light Weight Machine-Finish Book. Lot 19. Requirements on freedom from unbleached or ground-wood pulp, for 2 flat sizes, test requirements for ash, weight, bursting strength, thickness, and opacity, with color and finish in accord with standard samples at Gov. Print. Off.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 50 Per Cent Rag Machine-Finish Book. Lots 21, 22, 23. For flat sizes, requirements on percentage of rag, freedom from ground-wood pulp, ash, acidity, sizing, weight, bursting strength, thickness, and opacity, test methods, color, finish, etc., in accord with standard samples.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Supercalendered Book. Lots 26 to 31. Requirements for flat sizes and for rolls in various lots, on freedom from ground-wood pulp, ash, weight, bursting strength, thickness, and opacity, test methods, color, finish, etc., in accord with standard samples.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 50 Per Cent Rag Supercalendered Book. Lot 33. Requirements on dimensions, freedom from ground-wood pulp, on ash, acidity, sizing, weight, bursting strength, thickness, and opacity, test methods, color, finish, etc., in accord with standard samples.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Halftone Book. Lot 34. For 2 sizes, requirements on freedom from ground-wood pulp, on ash, weight, bursting strength, thickness, and opacity, test methods, color, finish, etc., in accord with standard samples.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Machine-Finish Lithograph. Lot 39. For 2 sizes, requirements on freedom from ground-wood pulp, ash, weight, bursting strength, thickness, surface and finish, test methods, color, formation, etc., in accord with standard samples.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 50 Per Cent Rag Machine-Finish Lithograph. Lot 40. For 1 size, requirements on freedom from ground-wood pulp, percentage of rag, ash, weight, bursting strength, thickness, surface, and finish, test methods, color, formation, etc., in accordance with standard sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty-First Report of the Committee on Paper Specifications; 1929. Recommended schedule for the public printing and binding and for use of Gov. Depts. Plant Fiber Machine-Finish Book. Lot 16. Requirements on percentage of fiber from corn or cotton stalks, straws, etc., color, finish, formation, and opacity, in accordance with standard samples at Gov. Print. Off., test requirements for ash, weight, and bursting strength, for 4 roll widths.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for the public printing and binding and for use of Gov. Depts. Antique Book. Lot 18. Requirements on freedom from unbleached or ground wood pulp, on dimensions of 2 cut sizes, test requirements for ash, acidity, sizing, weight, bursting strength, thickness, opacity, with color, finish, etc., in accordance with standard samples at Gov. Print. Off.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 50 Per Cent Rag Light Weight High Machine-Finish Book. Lot 20. For 2 sizes of flat paper, requirements on percentage of rag, freedom from ground-wood pulp, ash, bursting strength, weight, thickness, and opacity, test methods, color, finish, etc., in accord with standard samples.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 100 Per Cent Rag Machine-Finish Book. Lots 24, 25. Of highest quality for permanent records, requirements on general quality, percentage of new rags, ash, acidity, sizing, weight, folding endurance, bursting strength, opacity, color, appearance, with finish and texture in accordance with standard samples.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Coated book paper. *See* 475.6. Definitions and classification. *See* 470.1. Back lining paper. *See* 479.4.

475.73 Coating Paper

References.—Definitions and classification. *See* 470.1.

475.74 Mimeograph Paper

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Chemical Wood Mimeograph, White and Colored. Lots 43, 44. For 4 sizes, requirements on freedom from ground-wood pulp, on ash, weight, bursting strength, thickness, and opacity, test methods, mimeograph quality, color, finish, etc., in accord with standard sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for

Gov. Print. Off. and Depts. Ground Wood Mimeograph Paper. Lot 41. For 4 sizes, requirements on weight, bursting strength, thickness, and opacity, test methods, mimeograph quality, color, finish, etc., in accordance with standard samples.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 30 Per Cent Rag Mimeograph Paper. Lot 47. For 5 sizes, requirements on per cent rag, freedom from ground-wood pulp, on ash, weight, bursting strength, thickness, opacity, and sizing, test methods, mimeograph quality, color, finish, etc., in accord with standard sample.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

475.75 Music Paper

References.—Definitions and classification. *See* 470.1.

475.76 Offset Paper

References.—Definitions and classification. *See* 470.1.

476. TISSUE PAPER

476.1 COPYING TISSUE

References.—Carbon paper. *See* 476.21. Definitions and classification. *See* 470.1.

476.2 INDUSTRIAL TISSUES

476.21 Carbon Paper

U. S. Gov., Federal Specifications Board. 425; 1926. Light Weight Black Carbon Paper. For typewriter use for making 8 to 15 copies at a time, requirements on kinds of material in paper stock, weight of uncoated paper, number of first copies capable of, serviceability test on typewriter, in accordance with F. S. B. spec. 394 for paper, sheet sizes.

U. S. Gov., Federal Specifications Board. 426. 1926. Standard Weight Black Carbon Paper. For making 1 to 5 carbon copies at a time on a typewriter, requirements on freedom of stock from ground wood pulp, weight of uncoated paper, number of copies capable of, sizes, serviceability test on typewriter, in accordance with F. S. B. spec. 394 for paper.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

476.22 Cigarette Paper

References.—Definitions and classification. *See* 470.1.

476.23 Electrical Insulating Tissue Paper

References.—Methods of testing electrical insulating paper. *See* 719.52. Definitions. *See* 470.1.

476.24 Pattern Paper

References.—Standard pattern sizes. *See* 311.2. Definitions and classification. *See* 470.1.

476.25 Stereotyping Paper, Tissue and Molding Paper

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Facing Stereo Tissue Paper. (Lot 198.) For 1 weight and 1 roll size, of 100 per cent rag stock, requirements on ash, bursting strength, and test methods, with color and finish in accordance with sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Red Stereotype Molding Paper. (Lot 361.) For 1 weight and roll size, requirements on ash, bursting strength, molding quality, freedom from ground wood pulp stock, and test methods, with absorption, surface and appearance according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. White Stereotype Molding Paper. (Lot 360.) For 1 weight and roll size, requirements on ash, bursting strength, molding quality, freedom from ground wood pulp stock, and test methods, with absorption surface and appearance according to sample.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

476.3 SANITARY TISSUES

476.31 Paper Napkins

National Paper Trade Assn. Tissue Paper Mfrs. Assn. U. S. Gov., Dept. of Commerce, Bureau of Standards. Simplified Practice Recom. No. 46; 1926. Tissue Paper. Includes the adopted standard sizes and weights of plain tissue, full crêpe, semicrêpe, and oversize napkins.

References.—Definitions and classification. *See* 470.1.

476.32 Toilet Paper

National Paper Trade Assn. Tissue Paper Mfrs. Assn. U. S. Gov., Dept. of Commerce, Bureau of Standards. Simplified Practice Recom. No. 46; 1926. Tissue Paper. Includes adopted standard sizes and weights of sheet and roll toilet paper.

References.—Definitions and classification. *See* 470.1.

476.4 TISSUE WRAPPING PAPER

National Paper Trade Assn. Tissue Paper Mfrs. Assn. U. S. Gov., Dept. of Commerce, Bureau of Standards. Simplified Practice Recom. No. 46; 1926. Tissue Paper. Includes adopted standard sizes and weights of No. 1 and No. 2 sheet tissue, and of tissue for shoes.

References.—Sanitary wrapping paper, paraffin paper. *See* 477.5. Definitions and classification. *See* 470.1.

476.9 MISCELLANEOUS TISSUE PAPER

National Paper Trade Assn. Tissue Paper Mfrs. Assn. U. S. Gov., Dept. of Commerce, Bureau of Standards. Simplified Practice Recom. No. 46; 1926. Tissue Paper. Adopted standard sizes and weights of No. 1 and No. 2 sheet tissue, of tissue for shoes, of plain tissue, full crêpe, semicrêpe, and oversize napkins, of sheet and roll toilet paper.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. White Tissue Paper. (Lot 197.) For 1 weight and 1 sheet size, requirements on bursting strength, freedom from ground wood pulp, and test methods, with color and finish in accordance with sample.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1. Paraffin paper, waxed tissue paper. *See* 477.5.

477. WRAPPING PAPER

References.—Tissue wrapping paper. *See* 476.4.

477.1 BOGUS WRAPPING PAPER

References.—Definitions and classification. *See* 470.1.

477.2 MANILA WRAPPING PAPER

American Railway Assn. Freight Container Bureau. Recommended Specification. Circulars No. 5, 8, 10, and 12; 1923. Crates for Furniture. Includes paper for wrapping for both crated and uncrated furniture, for No. 1 sulphite (100 per cent sulphite) manila wrapper, weight, size of sheet. and Mullen test requirements.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Rope Manila Paper. (Lots 213 and 214.) For 4 weights, 1 roll size, of 100 per cent manila and (or) jute pulp stock, requirements on folding endurance, bursting strength, and test methods, with color and finish according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Sulphite Manila Paper. (Lots 211, and 212.) For 4 weights, any sheet size, and 1 roll size, requirements for chemical wood pulp, folding endurance, bursting strength, and test methods, with color and finish in accord with sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Wood Manila Paper. (Lots 209, 210.) For 4 weights, 2 sheet sizes, and 3 roll sizes, requirements on bursting strength and methods of test, with color and finish according to sample.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1. Sulphite manila paper. *See* 477.7.

477.3 NUMBER ONE KRAFT PAPER

American Railway Assn. Freight Container Bureau. Recommended Specification. Circulars No. 5, 8, 10, and 12; 1923. Crates for Furniture. Includes paper for wrapping for both crated and uncrated furniture, for No. 1 kraft, percentage of sulphate, weight, size of sheet, and Mullen test requirements.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. No. 1 Kraft Paper. For any sheet size, 2 weights, of 100 per cent sulphate pulp, requirements on folding endurance, bursting strength, and test methods, with color and finish according to sample.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

477.4 NUMBER TWO KRAFT PAPER

American Railway Assn. Freight Container Bureau. Recommended Specification. Circulars No. 5, 8, 10, and 12; 1923. Crates for Furniture. Includes paper for wrapping for both crated and uncrated furniture, for No. 2 kraft of chemical pulp and mechanically ground wood, weight, size of sheet, Mullen test requirements.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. No. 2 Kraft Paper. (Lots 217 to 219, incl.) For 6 weights, any sheet size and 5 roll sizes, of 100 per cent sulphate pulp, requirements on folding endurance, bursting strength, and test methods, with color and finish according to sample.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

477.5 SANITARY WRAPPING PAPER, PARAFFIN PAPER

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. White Paraffin Paper. (Lot 351.) For 1 weight and sheet size, requirements on bursting strength, freedom from ground wood pulp, percentage of paraffin, and test methods, with color and surface according to sample.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R125–31; 1931. Waxed Tissue Paper. Simplified practice recommended and accepted by industry. Requirements on weight of raw stock and of finished material, melting point of wax, for 2 grades of which one is made from bleached all sulphite tissue, accepted limited number of standard sizes, sheets per ream or unit, and method of packing, for waxed sheet tissue, sheet lunch rolls, lunch envelopes, butter wraps, and continuous household rolls.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1. Waxed paper linings for shipping boxes. *See* 957.2.

477.6 SCREENINGS

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Paper For 11 varieties of paper, including screenings, requirements on weight and standard sizes for wrapping meats.

References.—Definitions and classifications. *See* 470.1.

477.7 SULPHITE WRAPPING PAPER

American Railway Assn. Freight Container Bureau. Recommended Specification. Circulars No. 5, 8, 10, and 12; 1923. Crates for Furniture. Includes paper for wrapping for both crated and uncrated furniture, includes 100 per cent sulphite paper and fiber paper of sulphite and not over 20 per cent mechanically ground wood, weight, size of sheet, and Mullen test requirements.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Sulphite Manila Paper. (Lots 211 and 212.) For 4 weights, any sheet size, and 1 roll size, requirements on chemical wood pulp, folding endurance, bursting strength, and test methods, with color and finish in accordance with sample.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

477.8 WATERPROOF WRAPPING PAPER

References.—Definitions and classification. *See* 470.1.

477.9 MISCELLANEOUS WRAPPING PAPERS

American Railway Assn. Freight Container Bureau. Recommended Specification. Circulars No. 5, 8, 10, and 12; 1923. Crates for Furniture. Includes paper for wrapping for both crated and uncrated furniture, includes fiber paper of sulphite and not over 20 per cent mechanically ground wood, and rope paper of not less than 40 per cent rope stock, weight, size of sheet, and Mullen test requirements.

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Paper. For 11 varieties of paper, weight requirements, standard sizes for wrapping smoked meats, for greaseproof, vegetable parchment, glassine, packers manila, gray ham paper, screenings, fiber, kraft, and transparent cellulose papers.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

478. WRITING PAPER, DRAWING AND CHART PAPER

478.1 COMMERCIAL WRITING PAPER

478.11 Bond Writing Paper

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Declaration Bond, Tub Sized, Air Dried. (Lot No. 130.) Of 100 per cent new rag stock, white or cream, requirements on ash, acidity, sizing, weight, folding endurance, bursting strength, and writing quality, with color, finish, watermarking in accord with sample, test methods, two sheet sizes, two weights.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 75 Per Cent Rag White Bond. (Lots 125, 126.) 100 Per Cent Rag White Bond (Lots 128, 129) Tub-Sized, Air Dried. The 100 per cent rag bond is for permanent records. For 4 and 3 weights respectively, requirements on width limits, freedom from ground wood pulp, on ash, acidity, sizing, folding endurance, bursting strength, writing quality, and watermarking, test methods, color, etc., in accord with standard sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Sulphite Bond, White and Colored. Lots 101 to 105. For 4 weights and various sizes and colors, of 100 per cent chemical wood pulp, requirements on ash, folding endurance, bursting strength, and writing quality, test methods, color, finish, etc., in accord with standard sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 30 per cent Rag Bond (lots 109 to 117), 50 per cent Rag Bond (lots 120 to 123), White and Colored, Tub-Sized, Air-Dried. For 4 weights and various sizes and colors, requirements on freedom from groundwood pulp, on ash, sizing, folding endurance, writing quality, and watermarking, test methods, color, finish, etc., in accord with standard sample.

Writing Paper Mfrs. Assn. Trade Customs; 1928. Includes list of 25 regular sheet sizes for flats and bonds, and permissible under-runs or overruns on any delivery.

Writing Paper Mfrs. Assn. Approved by National Paper Trade Assn. Trade Customs; 1928. Table of standard substances and weights for various sizes of bonds and linens, flat writings and ledgers.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

478.12 Flat Writing Paper

Writing Paper Mfrs. Assn. Trade Customs; 1928. Includes list of 25 regular sheet sizes for flats and bonds, and permissible under-runs or over-runs on any delivery.

Writing Paper Mfrs. Assn. Approved by National Paper Trade Assn. Trade Customs; 1928. Table of standard substances and weights for various sizes of bonds and linens, flat writings and ledgers.

References.—Definitions and classification. *See* 470.1.

478.13 Ledger Paper

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Ledger Paper, White and Colored, Tub Sized, Air Dried. 30 per cent Rag (lots 154 to 157). 50 per cent Rag (lots 160 to 165). 75 per cent Rag (lots 168–173). For various sheet sizes and weights, requirements on ash, sizing, folding endurance, bursting strength, freedom from ground wood pulp, writing and erasing qualities, test methods, with color, finish, watermarking, etc., in accordance with sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 100 per cent Rag White Ledger, Tub Sized, Air Dried. For permanent records, 6 weights, various sheet sizes, requirements on ash, acidity, sizing, folding endurance, bursting strength, writing and erasing qualities, and test methods, with color, finish, and watermarking in accordance with sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Sulphite Ledger, White and Colored (lots 151, 152, 153). For 5 weights, requirements on wood pulp stock, ash, folding endurance, bursting strength, writing quality, sheet width limits, with color, finish, etc., in accordance with sample, test methods.

Writing Paper Mfrs. Assn. Trade Customs; 1928. Includes list of 18 regular sheet sizes for ledger paper, and permissible under-runs or over-runs on any delivery.

Writing Paper Mfrs. Assn. Approved by National Paper Trade Assn. Trade Customs; 1928. Table of standard substances and weights for various sizes of bonds and linens, flat writings and ledgers.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

478.14 Linen Paper

Writing Paper Mfrs. Assn. Approved by National Paper Trade Assn. Trade Customs; 1928. Table of standard substances and weights for various sizes of bonds and linens, flat writings and ledgers.

References.—Definitions and classification. *See* 470.1.

478.15 Papeterie Paper

References.—Definitions and classification. *See* 470.1.

478.16 Parchment Deed Paper

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committete on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Parchment Deed, White and Cream, Tub Sized, Air Dried. (Lot 131.) Of 100 per cent new rag stock, requirements on ash, acidity, sizing, weight, folding endurance, bursting strength, and writing quality, with color, finish, etc., in accordance with sample, test methods, sheet size.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

478.17 Railroad Writing Paper

References.—Definitions and classification. *See* 470.1.

478.18 Wedding Writing Paper

References.—Definitions and classification. *See* 470.1

478.19 Miscellaneous Commercial Writing Paper

Envelope Manufacturers Assn. of America. Trade Customs; 1928. Substance number range for 9 kinds of paper used in manufacture of envelopes, standard weights listed, permissible variations from quantities ordered.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 50 per cent Rag Index Paper, White and Colored, Single Ply. (Lots 190 to 193 incl.) For 4 weights and various sheet sizes, requirements on ash, bursting strength, thickness, freedom from ground wood pulp, writing and erasing qualities and test methods, with color and finish according to sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 100 per cent Rag Index Paper, White and Cream, Single Ply, Tub Sized, Air Dried. (Lot 196.) For permanent records, 1 weight, and 2 sheet sizes, requirements on ash, acidity, sizing, bursting strength, thickness, writing and erasing qualities, and test methods, with color and finish in accordance with sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 100 per cent Rag White Writing Paper, Vellum Finish, Tub Sized, Air Dried. Lot 63. Requirements on ash, acidity, sizing, weight, bursting strength, and writing quality, test methods, color, finish, etc., in accord with standard samples, 1 weight and sheet size.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Sulphite Index Paper, White and Colored, Single Ply. (Lots 184 to 187.) For 4 weights and 3 sheet sizes, of 100 per cent chemical wood pulp, requirements on ash, bursting strength, thickness, writing and erasing qualities, and test methods, with color and finish in accordance with sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Sulphite Writing Paper, White and Colored. Lots 55 to 61. For various flat and roll sizes and colors, requirements on 100 per cent chemical wood pulp stock, on ash, weight, folding endurance, bursting strength, writing quality, and test methods, color, finish, etc., in accordance with standard samples.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. U S M O Writing Paper, White and Blue. Lot 52. For one width of roll, requirements on 100 per cent chemical wood pulp stock, on ash, weight, folding endurance, bursting strength, writing quality, and watermarking, methods of test, color, finish, etc., in accord with standard sample.

Writing Paper Mfrs. Assn. Trade Customs; 1928. Includes list of 19 regular sheet sizes for looseleaf paper, and permissible under-runs or over-runs on any delivery.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Safety writing paper. *See* 478.33. Definitions and classification. *See* 470.1.

478.2 DUPLICATING PAPER

478.21 French Folio Paper

References.—Definitions and classifications. *See* 470.1.

478.22 Manifold Paper (Includes Stencil Paper)

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 50 Per Cent Rag Manifold Paper, White and Colored. Lots 73 to 76. For 2 weights and various sizes and colors, requirements on freedom from ground-wood pulp, on ash, bursting strength, and writing quality, test methods, color, finish, etc., in accord with sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 50 Per Cent Rag White Glazed Manifold Paper. Lot 83. For 1 weight and 2 sizes, requirements on freedom from ground-wood pulp, on ash, bursting strength, and writing quality, test methods, color and finish in accord with standard sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 100 Per Cent Rag Manifold Paper, White and Colored, Tub Sized, Air Dried. Lots 78 to 81. For 2 weights and various sizes, requirements on ash, acidity, sizing, folding endurance, bursting strength, and writing quality, test methods, color, finish, etc., in accord with standard sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Sulphite Manifold Paper, White and Colored. Lots 70, 71. For 1 weight and 4 sizes of 100 per cent chemical wood pulp stock, requirements on ash, bursting strength, and writing quality, test methods, color, finish, etc., in accord with standard sample.

U. S. Gov., Federal Specifications Board. 484a. 1927. 50 Per Cent Rag Manifold Paper, White and Colored, Unglazed. Requirements on freedom from ground wood pulp, weights for 2 weight grades, bursting strength, ash, sizing, sizes, with color, finish and formation in conformity with accepted sample, methods of test in accordance with F. S. B. spec. 394 for paper.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

478.23 Onionskin Paper

References.—Definitions and classification. *See* 470.1. Manifold paper. *See* 478.22.

478.3 INDUSTRIAL PAPER

478.31 Chart and Map Paper

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. 50 Per Cent Rag Lithograph-Finish Map Paper, Tub Sized, Air Dried. Lot 65. For 3 weights and 8 sizes, requirements on freedom from ground-wood pulp, on ash, sizing, weight, folding endurance, bursting strength, surface and finish, test methods, color, formation, etc., in accordance with standard sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Lithograph-Finish Map Paper. Lot 64. For 2 weights and 5 sizes, requirements on freedom from ground-wood pulp, on ash, weight, folding endurance, bursting strength, surface and finish, test methods, color, formation, etc., in accord with standard sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended Schedule for Gov. Print. Off. and Depts. 100 per cent Rag White Chart Paper, Lithograph-Finish, Tub-Sized, Air-Dried. Lot 69. For one weight, requirements on width limits, ash, sizing, folding endurance, bursting strength, thickness, erasure, formation, sorting, and test methods, color, finish, and surface in accord with standard sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended Schedule for Gov. Print. Off. and Depts. 75 per cent Rag Lithograph-Finish Map Paper, Tub-Sized, Air-Dried. Lots 66, 67. For 4 weights and several sizes, requirements on freedom from ground-wood pulp, on ash, sizing, weight, folding endurance, bursting strength, surface and finish, and test methods, color, formation, etc., in accord with standard sample.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

478.32 Drawing Paper

U. S. Gov., Federal Specifications Board. UU–B–561; 1931. Bristol Board. For rough and smooth types, first and second grade of each, for use with pencil or drawing ink, ink lining and erasure test requirements.

U. S. Gov. Federal Specifications Board. 594; 1928. Detail Drawing Paper. For white detail, cream or buff detail, and manila detail, of slightly grained surface or smooth, mounted or unmounted, requirements on freedom from defects, percentage of rag, weight, bursting strength, folding endurance, and transparency ratio for the white detail, percentage of rag, weight, and bursting strength for buff or cream detail, pencil marking and erasure tests for all types, methods of test according to F. S. B. spec. 394 for paper.

U. S. Gov., Federal Specifications Board. 595; 1928. Drawing Paper. For Whatman type, hot pressed, cold pressed, and rough; for white drawing, smooth surface or slightly grained surface, or pebbled surface; for buff or cream drawing, smooth surface, and slightly grained surface; for students' drawing paper with slightly grained surface; requirements on weight, percentage of rag, bursting strength, mounting and thread count of mounting muslin, ink drawing capacity and erasing qualities, methods of test according to F. S. B. spec. 394 for paper.

U. S. Gov., Federal Specifications Board. 596; 1928. Printed Drawing Paper. For drawing papers and tracing papers of the types, profile, cross section, logarithmic, plan profile, township, coordinate isometric, and statistical diagrammatic, suitable for pencil and ink drawings, general requirements such as continuity, accurate spacing, uniformity of width and color of lines, quality of ink.

U. S. Gov., Federal Specifications Board. 597; 1928. Ruled Drawing Paper. For cross section paper and topographical paper suitable for pencil and ink drawings, general requirements such as continuity, accurate spacing, uniformity of width and color of lines, lining and erasing qualities of ink, etc.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

478.33 Safety Writing Paper

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended Schedule for Gov. Print. Off. and Depts. Blue U S M O Safety Writing Paper, Safety or Sensitive Design. For 2 roll sizes, requirements on all chemical wood pulp, on ash, weight, folding endurance, bursting strength, writing quality, and watermarking, test methods, color, finish, safety properties, etc., in accordance with standard samples.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Safety Writing Paper, Colored. Lot 53. For 3 sizes of various colors, requirements on 100 per cent chemical wood pulp stock, on ash, weight, folding endurance, bursting strength, writing quality, and safety device, test methods, color, finish, etc., in accord with standard sample.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

478.34 Sensitizing Paper

U. S. Gov., Dept. of Commerce. Bureau of Standards. R98–29; 1929. Photographic Paper. Simplified practice recommended and accepted by industry covering a selected list of stock sizes and varieties as standard for cut sizes of photographic paper and for roll sizes of single weight and double weight.

U. S. Gov., Federal Specifications Board. UU–P–81; 1931. Blue Print Paper, Permanent-Record (Sensitized and Unsensitized). For thin, medium, and thick grades suitable for permanent records which are subject to frequent handling, requirements on weight, 100 per cent rag stock, folding endurance, wet tensile strength, coating and finish, standard widths.

U. S. Gov., Federal Specifications Board. UU–P–86; 1931. Blue Print Paper, Semipermanent-Record (Sensitized and Unsensitized). For thin, medium, and thick grades of blue print paper subject to much handling, requirements on weight, 100 per cent rag stock, folding endurance, wet tensile strength, coating and finish, standard widths.

U. S. Gov., Federal Specifications Board. UU–P–91; 1931. Blue Print Paper, Temporary-Record (Sensitized and Unsensitized). For medium and thick grades in rolls, suitable for blue prints subjected to considerable wear and tear, requirements on weight, percentage of rag stock, folding endurance, wet tensile strength, coating and finish, standard widths.

U. S. Gov., Federal Specifications Board. UU–P–141; 1931. Brown-Print Paper, Permanent Record (Sensitized and Unsensitized. For thin and medium grades in rolls, suitable for permanent records which are subject to frequent handling, requirements on weight, thickness, 100 per cent rag stock, folding endurance, wet tensile strength, coating and finish, standard widths, to conform with F. S. B. spec. 394 for paper.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

478.35 Tracing Paper

U. S. Gov., Dept. of Commerce. Bureau of Standards. C63; 1917. Specification of the Transparency of Paper and Tracing Cloth. Describes a standard method of specifying the transparency using principle of contrast ratio, description of apparatus and method of test, directions for making application for test.

U. S. Gov., Federal Specifications Board. 596; 1928. Printed Drawing Paper. For drawing papers and tracing papers of the types, profile, cross section, logarithmic, plan profile, township, coordinate, isometric, and statistical diagrammatic, suitable for pencil and ink drawings, general requirements such as continuity, accurate spacing, uniformity of width and color of lines, quality of ink, transparency of tracing paper.

U. S. Gov., Federal Specifications Board. 598; 1928. Tracing Paper. For smooth and slightly grained surfaced papers of rag and of sulphite white manifold and oil-treated manifold types, and for smooth surfaced French vegetable type, requirements on general quality, weights, composition of manifold papers, tests of manifold paper for erasure and ink and pencil line drawing qualities, transparency test for all types, bursting strengths of manifold papers, methods of test according to F. S. B. spec. 394 for paper and Bur. of Standards Circ. 63 for transparency test.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Definitions and classification. *See* 470.1.

479. MISCELLANEOUS SPECIFICATIONS FOR PAPER

479.1 TRANSFER PAPER

References.—Definitions and classification. *See* 470.1.

479.2 GUMMED PAPER

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 41, Section 4. Paper Sealing Strip. For covering seams of fibreboard boxes, requirements on use of No. 1 kraft, weight, strength by Cady or Mullen test, minimum width.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. White Gummed Paper. (Lots 352, 353.) For 1 weight and 2 sheet sizes, requirements on freedom from ground wood pulp stock and on freedom from curl, with color, finish, and adhesive qualities according to sample.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R114–30; 1930. No. 1 Kraft Sealing Tape. Simplified practice recommended and accepted by industry covering a standard schedule of stock varieties of sealing tape, with weight, bursting strength, length per roll, width, and packaging requirements for each variety.

References.—Methods of testing. *See also* 470.3.

479.3 PAPER FOR ABRASIVE PAPERS

Abrasive Paper and Cloth Manufacturers Exchange. Abrasive Coated Products; 1929. Includes rope paper as backing for abrasive, requirements on weight, thickness, minimum tensile strength, method of testing.

References.—Standard sizes, methods of testing. *See* 470.2, 470.3.

479.4 MISCELLANEOUS PAPERS USED IN PRINTING PROCESS

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Back Lining Paper. For Case Making Machines. (Lot 364.) For 1 weight and roll size, requirements on bursting strength and test methods, with surface and finish in accordance with sample.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Oiled Manila Tympan Paper. For 1 weight and 3 roll sizes, requirements on bursting strength, oiliness, freedom from ground wood pulp stock, and test methods, with surface according to sample. For use in printing process.

U. S. Gov., Congress. Joint Committee on Printing. Twenty First Report of Committee on Paper Specifications; 1929. Recommended schedule for Gov. Print. Off. and Depts. Plate Wiping Paper for Embossing Presses. (Lot 363.) For 1 weight and roll size, requirements on bursting strength and test methods, with surface according to sample.

References.—Standard sizes, methods of testing. *See also* 470.2, 470.3. Stereotype tissue and molding paper. *See* 476.25. Definitions and classification. *See* 470.1.

480–489 BOOKS AND OTHER PRINTED MATTER

481. BOOKS AND PAMPHLETS

American Automobile Assn. 1929 Catalogue. Emergency Road Service Report Books and Report Forms. Standard Books and Forms.

American Automobile Assn. 1929 Catalogue. Tour Books. Standard size and contents of regional tour books giving automobile travel information and maps.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R84–28; 1928. Composition Books. Simplified practice recommended and accepted by industry establishing a limited schedule of standard stock varieties covering 2 grades of ground wood paper, 4 grades of writing paper with writing with ink test, 4 grades or weights of cover stock, numbers of leaves for crown size and demy size.

References.—Standard paper sizes, methods of testing. *See also* 470.2, 470.3.

482. MAPS, CHARTS, AND MUSIC

American Automobile Assn. 1929 Catalogue. Tour Maps. Size, scale, number of colors for regional, state and U. S. maps showing automobile routes and mileage.

References.—Chart and map paper. *See* 478.31. Navigational and topographical symbols for map making. *See* 910.

483. LITHOGRAPHIC PRINTS

484. BOOKLETS

489. MISCELLANEOUS PRINTED MATTER

National Wholesale Druggists Assn. Standard Forms; 1929. 4 by 6 printed price list standard card, standard sizes and form for invoices, standard size of catalogue page with recommended size of type.

Railway Accounting Officers Assn. Railway Accounting Procedure; 1931. Standard Forms, Freight Waybills, Passenger Traffic and Freight Traffic Accounting Forms. Requirements on headings, spacing, dimensions of forms, quality and weight of paper, and for waybills the strength requirements for paper.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R34; 1924. Warehouse Forms. Simplified practice recommended and accepted by industry establishing standard forms, their dimensions, the arrangement and content of printed matter, for rate quotation form, over, short and damage report, warehouse receipts, notice of order filled, bill of lading, account of stock, household goods form, packing ticket, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R37–28; 1928. Commercial Forms. Simplified practice recommended and accepted by industry establishing standard dimensions, arrangement and content of printed matter appearing on form, for simplified invoice form, inquiry form, and purchase order form.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R50; 1926. Bank Checks, Notes, Drafts and Similar Instruments. Simplified practice recommended and accepted by industry establishing standard sizes for bank checks, bank drafts, notes, trade acceptances, counter checks, customers checks, pocket checks, deposit slips, with uniform arrangement of subject matter on checks.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R93–29; 1929. Paper Shipping Tags. Simplified practice recommended and accepted by industry covering a selected limited list of standard stock varieties of reinforced eyelet type shipping tags giving dimensions, quality, grades of paper, and standard colors.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R113–30; 1930. Restaurant Guest Checks. Simplified practice recommended and accepted by industry covering a limited standard schedule of guest checks, with widths and lengths, colors of ink, varieties and weights of cardboard and paper used, and numbering.

U. S. Gov., Federal Specifications Board. GG–C–101; 1930. Calender Pads and Stands. For 3 types, ordinary folding type, bound memorandum type, and large size folding executive type, requirements on substance and general quality of paper, size of sheets, punching, printed matter on sheet, dimensions and structural features of metal base, paper in accordance with specifications of U. S. Congress, Joint Committee on Printing.

490–499 MISCELLANEOUS PAPER PRODUCTS

491. CONTAINERS

References.—Paper pags and paper linings for containers. *See* 957.2. Fiber barrels. *See* 951.11. Fiber drums. *See* 951.31. Fiber firkins. *See* 951.45. Fiber pails. *See* 951.63. Fiber kits. *See* 951.66. Fiber tubs. *See* 951.73. Fiberboard baskets. See 952.14. Paper and fiberboard boxes. *See* 953.2. Cartons. *See* 954.1. Paper and fiber cases. *See* 954.22. Paper wrappings and coverings. *See* 959.6.

492. ELECTRICAL INSULATING PAPER

493. PAPER PULLEYS

494. ENVELOPES

U. S. Gov., Dept. of Commerce. Bureau of Standards. T343; 1927. Study of the Windows of Window Envelopes for the Purpose of Developing Standard Specifications. Includes suggested specifications on permissible opacity, gloss, and impregnating material and required bursting strength for one-piece envelopes and on opacity, gloss, bursting strength, and adhesion of windows in 2-piece envelopes. U. S. postal regulations relating to window envelopes as regards location of window, allowance of other printed matter on envelope, return address, etc.

U. S. Gov., Federal Specifications Board. G–P–641; 1931. Negative Preservers, Paper. An envelope type preserver for photographic negatives, paper to be No. 1 kraft suitable for writing on, requirements on type of pulp, weights for thin and medium sheets, folding endurance, bursting strength, style, finish, and sizes.

U. S. Gov., Post Office Dept. U. S. Official Postal Guide; 1930; p. 22. Window Envelopes. Postal regulations covering limitations on the position of the window and requirement that window be parallel to length of envelope, restrictions on location of printed matter.

References.—Methods of testing paper. *See* 470.3. Paper for envelopes. *See* 478.19.

495. FIBER CONDUIT

References.—Fiber conduit for electrical wiring. *See* 715.11.

NONMETALLIC MINERALS

COAL, PETROLEUM, ASPHALT, AND MINERAL WAX

500. GENERAL ITEMS

American Assn. of State Highway Officials. Tentative Method T-67. Undated. Method of Verification of Testing Machines. Same as E 4-27 of Am. Soc. for Testing Materials.

American Society for Testing Materials. E 4-27; 1927. Methods of Verification of Testing Machines. Definitions, verification of testing machines that measure load by method of standard weights, by standardized proving levers, by elastic calibration device, by comparison method, tolerances for new and for old machines.

American Society for Testing Materials. E 6-30 and E 6-30T; 1930. Definitions of Terms Relating to Methods of Testing. Definitions of stress, strain, stress-strain diagram, elastic limit, yield point, tensile strength, compressive strength, modulus of elasticity.

American Society for Testing Materials. E 11-26; 1926. Sieves for Testing Purposes. Construction of woven wire sieves of brass, bronze, or other suitable wire, micron designation and corresponding U. S. standard sieve series number, sieve openings, wire diameters, and tolerances for 30 sizes, permissible methods of measurement of openings and of wire diameters.

American Society for Testing Materials. E 12-27; 1927. Definitions of Terms Relating to Specific Gravity. Covers specific gravity and absolute specific gravity of solids and liquids, apparent specific gravity of solids, and bulk specific gravity of solids.

American Society for Testing Materials. Tentative Definition. E 13-28T; 1928. Definition of the Term Screen (Sieve). Covers plate, sheet, or woven cloth types.

References.—Other specifications for sieves. *See* 645.31.

501. COAL AND COKE

501.0 GENERAL ITEMS

American Society of Mechanical Engineers. Power Test Code. Solid Fuels; 1927. Methods of sampling coal and laboratory analysis, including apparatus and method for determination of moisture, ash, volatile matter, fixed carbon, sulphur, phosphorus in ash, fusibility of ash, ultimate chemical analysis, calorimetric test, flue gas analysis and combustible matter in ashes and stack cinders, analysis of powdered coal, Frazer classification of solid fuels.

American Society for Testing Materials. D 21-16; 1916. Approved by American Standards Assn. as X 1-1921. Method of Sampling Coal. Collection of gross sample, minimum size, crushing, mixing and reduction, collection of sample for determination of total moisture.

American Society for Testing Materials. D 121-30; 1930. Definitions of Terms Relating to Coal and Coke. Definitions of proximate and ultimate analysis, moisture, ash, volatile matter, fixed carbon, beehive coke, by-product coke, coke breeze, dry coke.

American Society for Testing Materials. Tentative Specifications. D 121-30T; 1930. Definition of the Term Coke.

American Society for Testing Materials. D 197-30; 1930. Method of Test for Fineness of Powdered Coal. Sizes, dimensions, and construction of sieves, collection of sample for both multiple and unit powdered coal systems, test procedure for hand sieving of sample.

American Society for Testing Materials. D 271-30; 1930. Methods of Laboratory Sampling and Analysis of Coal and Coke. Approved by American Standards Assn. as K18-1930. Sizes and types of apparatus, methods of sampling dry and wet coal and coke, determination of moisture, ash, volatile matter, fixed carbon, sulfur, phosphorus in ash, fusibility of ash, ultimate analysis, calorimetric determination.

U. S. Gov., Dept. of Commerce. Bureau of Mines. Tech. Paper 113; 1919. Directions for Sampling Coal for Shipment or Delivery. Time of sampling, collection and size of gross sample, wagon-load sampling, carload sampling, ship or barge sampling, crushing, halving, and quartering of sample, sealing and mailing, includes description of sample container of bureau.

501.1 ANTHRACITE COAL

American Society for Testing Materials. D 310-31; 1931. Method of Test for Size of Anthracite. Covers screen tests for determination of undersize or oversize in any given commercial size, dimensions and design of screens, sampling according to A. S. T. M. method D 21, procedure.

Anthracite Institute. Standard Anthracite Specifications; 1929. Standard screen grading for broken, egg, stove, nut, pea, and buckwheat anthracite coal.

References.—Definitions, methods of sampling and of testing. *See also* 500. and 501.0.

501.2 BITUMINOUS COAL

American Society for Testing Materials. D 166-24; 1924. Gas and Coking Coals. Methods of sampling using A. S. T. M. method D 21, method of chemical analysis according to A. S. T. M. D 271, requirements on limiting percentages of moisture, volatile matter, ash, and sulfur, minimum fusion point of ash.

American Society for Testing Materials. D 291-29; 1929. Method of Test for Cubic Foot Weight of Crushed Bituminous Coal. Does not apply to powdered coal used in boiler plants but to coarsely crushed coal as used in coke ovens, dimensions of cubic foot test box, preparation of sample and procedure for determination of weight, for sampling use made of A. S. T. M. method D 21.

American Society for Testing Materials. D 311-30; 1930. Method of Test for Sieve Analysis of Crushed Bituminous Coal. For rather coarsely crushed coal as used in coke ovens, not applicable to powdered coal for boiler plants. Requirements on ratio of sieve openings for succeeding sizes of sieves, sampling according to A. S. T. M. method D 21, sieve sizes, test procedure.

U. S. Gov., Dept. of Commerce. Bureau of Standards. RR1-29; 1929. Simplification of Sizes and Terminology of High Volatile Bituminous Coal. A regional simplified practice recommended and accepted by industry for coal handled over docks at American head of the Great Lakes. Defines screen sizes and size names for bituminous coal sized at the docks.

References.—Definitions, methods of sampling and of testing. *See also* 500., 501.0.

501.3 SEMIBITUMINOUS COAL

501.4 COAL-TAR PRODUCTS

References.—Coal-tar chemical products. *See* 800–809.

501.5 COKE

American Society for Testing Materials. D17–16; 1916. Foundry Coke. Method of sampling and reduction of sample, requirements on permissible percentages of volatile matter, fixed carbon, ash and sulfur, using A. S. T. M. test method D 271, deduction for excess moisture.

American Society for Testing Materials. D 293–29; 1929. Method of Test for Sieve Analysis of Coke. Sizes and mesh tolerances for sieves, size and selection of samples, test procedure.

American Society for Testing Materials. D 292–29; 1929. Method of Test for Cubic Foot Weight of Coke. Dimensions of cubic foot test box, preparation of sample, procedure for determination of weight, sampling according to A. S. T. M. method D 21.

American Society for Testing Materials. D 294–29; 1929. Method of Tumbler Test for Coke. Dimensions, construction and material of tumbling machine, sieve sizes, collecting and sizing sample, test procedure.

American Society for Testing Materials. D 141–23; 1923. Method of Shatter Test for Coke. Dimensions and design of shatter test machine, sampling of by-product and of beehive coke, sampling at delivery, test procedure.

American Society for Testing Materials. D 167–24; 1924. Method of Test for Volume of Cell Space of Lump Coke. Formula for computation of cell space, dimensions and design of apparatus for determination of apparent and of true specific gravity, sampling methods at source and at delivery, test procedure.

U. S. Gov., Federal Specifications Board. Q–C–571; 1930. Foundry Coke. For 3 grades, cupola, large general foundry, and small general foundry coke, requirements on conformity to screen size specified, chemical composition including fixed carbon and ash, sizes, shatter test, using test methods of A. S. T. M.

References.—Definitions, methods of sampling and of testing. *See also* 500., 501.0.

501.6 CHARCOAL

American Pharmaceutical Assn. National Formulary; 1926. Purified Animal Charcoal. Description and physical properties and test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Wood Charcoal. For medicinal purposes, physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

502. PETROLEUM

502.0 GENERAL ITEMS

American Society for Testing Materials. Tentative Test Methods. D 287–30T; 1930. Method of Test for Gravity of Petroleum and Petroleum Products by Means of the Hydrometer. Does not apply for road oils, road tars, asphalt cements and soft tar pitches. Definition of specific gravity and A. P. I. gravity and comparison table, graduation and accuracy requirements of hydrometer and thermometer, test method.

American Society for Testing Materials. Tentative Definitions. D 288–31T; 1931. Definitions of Terms Relating to Petroleum. Includes definitions of crude petroleum, petroleum naphtha, petroleum spirits, kerosine, gas oil, fuel oil, oil shale, end point, engine distillate, etc.

502.1 CRUDE PETROLEUM

American Society for Testing Materials. Tentative Methods. D 270–30T; 1930. Methods of Sampling Petroleum and Petroleum Products. Includes all petroleum products except gases. Dimensions and design of apparatus, sampling procedure for bottle or beaker sampling of tank cars and tanks, continuous sampling of pipe lines, dipper sampling for stream discharge, thief sampling for cans, drums, and tank cars, borings sampling for wax and soft solids in cases, cakes, barrels, grab sampling for loose lumpy materials in bins, sacks, barrels.

American Society for Testing Materials. Tentative Test Method. D 285–30T; 1930. Method of Test for Distillation of Crude Petroleum. For determining the percentages and distillation range of the naphtha in any refinable crude, but does not specify what quality of product shall be defined as naphtha, dimensions and tolerances of Hempel distilling flask, dimensions and construction of fractionating column and condenser, distillation procedure, for redistillation for naphtha method D 86 of A. S. T. M. is used.

New York Produce Exchange. Rules Regulating the Petroleum Trade; 1920. Crude Petroleum. General definition of pure natural mineral oil, untreated, free from water, sediment, and adulterant.

References.—Definitions and methods of testing. *See also* 502.0. Road oils. *See also* 505.2. Fuel and gas oils. *See also* 503.4.

502.2 PETROLEUM PRODUCTS

American Electric Railway Engr. Assn. Recommended Specification; WP117–26; 1926. Determination of Water in Petroleum Products and Other Bituminous Materials. Specification and dimensioned drawings of apparatus, specification for solvent, procedure.

American Society for Testing Materials. D 95–30; 1930. Approved by American Standards Assn. as Z11i–1930. Method of Test for Water in Petroleum Products and Other Bituminous Materials. Especially applicable to petroleum, fuel oil, road oil, coal tar, water-gas tar, coke-oven tar, etc. Determination of water by distilling sample with volatile solvent, dimensions and design of still, distillation requirements for solvents, test procedure.

American Society for Testing Materials. D 96–30; 1930. Approved by American Standards Assn. as Z11h–1930. Method of Test for Water and Sediment in Petroleum Products by Means of Centrifuge. May be used for crude mineral oils and fuel oils; a more accurate method is given in A. S. T. M. method D 95. Structural requirements and speed of centrifuge, capacity and graduation for centrifuge tubes, test procedure.

American Society for Testing Materials. D 97–30; 1930. Approved by American Standards Assn. as Z11e–1930. Cloud and Pour Points of Petroleum Products. Definition of cloud point for transparent oils and of pour point for other petroleum oils, dimensions of test jar, dimensions, design and graduation of low range thermometers, assembly of apparatus, test procedure.

American Society for Testing Materials. D 286–30; 1930. Approved by American Standards Assn. as Z11w–1930. Method of Test for Determination of Autogenous Ignition Temperatures. For liquid and semiliquid peroleum products, test procedure by method of dropping sample into flask, resting in molten solder bath.

American Society for Testing Materials. E 12–27; 1927. Definitions of Terms Relating to Specific Gravity. Covers specific gravity and absolute specific gravity of solids and liquids, apparent specific gravity of solids, and bulk specific gravity of solids.

New York Produce Exchange. Rules Regulating the Petroleum Trade; 1920. Refined Petroleum. Requirements on burning test and gravity, method of test for burning test.

U. S. Gov., Federal Specifications Board. O—E—751, 1931. Petroleum Ether. Requirements on distillation range, color, absence of sediment, residue on heating, nonspot forming in spot test, lack of acidity, and absence of benzene hydrocarbons, methods of sampling, methods of making distillation and acidity tests.

References.—Definitions and methods of testing. *See also* 502.0. Fuel and illuminating oils. *See* 503. Lubricating oils and greases. *See also* 504. Oil asphalt. *See also* 505.14. Miscellaneous oils. *See also* 509.

503. FUEL AND ILLUMINATING OILS

503.0 GENERAL ITEMS

American Assn. of State Highway Officials. Tentative Method. T–72. Undated. Methods of Test for Viscosity of Petroleum Products and Lubricants. Same as D 88–30 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–73. Undated. Method of Test for Flash Point by Means of the Pensky-Martens Closed Tester. Same as D 93–22 of Am. Soc. for Testing Materials.

American Chemical Society. Standard Methods for the Sampling and Analysis of Commercial Fats and Oils; 1926. Published by American Oil Chemists Society. Includes methods of sampling from different types of containers, apparatus and methods of determination of moisture, volatile matter, insoluble impurities, soluble mineral matter, fatty acids combined as mineral soap, free fatty acids, titer, unsaponifiable matter, iodine number, saponification number, melting point, softening point, slipping point, flow test, cloud test, bleach test, Reichert-Meissl and Polenske numbers, Kirschner value, index of refraction, specific gravity, acetyl value, open-cup flash and fire test, standard color for commercial fat, other recommendations not yet standardized.

American Society of Mechanical Engineers. Power Test Codes. Instruments and Apparatus, Part 16; 1931. Density Determinations. Density standards for liquids and gases, methods of density measurement for solids including measuring and weighing method, picnometer method, and hydrostatic weighing method; for liquids, the picnometer, hydrostatic weighing, hydrometer, and westphal balance methods; for gases and vapors the methods described in U. S. Bureau of Standards publications T89 and T94 are referred to.

American Society of Mechanical Engineers. Test Code for Liquid Fuels; 1930. Methods of conducting tests for calorific value, gravity, determination of carbon, hydrogen, sulphur, ash, water and sediment, viscosity, distillation, flash and fire points, cloud and pour points, color, corrosion, acidity, burning quality, and carbon residue, citing the applicable methods of A. S. T. M. and U. S. Bureau of Mines. Method of measurement of flue gas temperature, taking samples and analysis apparatus for flue gases.

American Society for Testing Materials. D 6–30; 1930. Method of Test for Loss on Heating of Oil and Asphaltic Compounds. Requirements on preparation of sample, limiting dimensions and structural requirements for test oven, dimensions, graduation, standardization, and permissible error of mercury thermometer, test procedure.

American Society for Testing Materials. D 56–21; 1921. Approved by American Standards Assn. as K 8–1923. Method of Test for Flash Point of Volatile Flammable Liquids. For liquids flashing below 175° F. except fuel oils for which A. S. T. M. method D 93 is preferred, dimensions of Tag Closed Tester, dimensions, graduation marking and accuracy requirements for thermometer, test procedure.

American Society for Testing Materials. D 86–30; 1930. Approved by American Standards Assn. as Z11j–1930. Methods of Test for Distillation of Gasoline, Naphtha, Kerosene, and Similar Petroleum Products. Dimensions and design of flask, condenser, support, and thermometers, test procedure, corrections for barometric pressure.

American Society for Testing Materials. D 88–30; 1930. Approved by American Standards Assn. as Z11b–1930. Methods of Test for Viscosity of Petroleum Products and Lubricants. Use of Saybolt universal viscosimeter for lubricants and of Saybolt Furol viscosimeter for fuel oils, dimensions and graduation of thermometer, dimensions of oil tubes, temperatures for making determinations, test procedure.

American Society for Testing Materials. Tentative Test Methods. D 90–30T; 1930. Method of test for Sulphur in Motor Fuels, Naphthas and Illuminating Oils (Lamp Method). Dimensions and assembly of absorber, lamp and spray trap, preparation of reagents, test procedure, accuracy of determination.

American Society for Testing Materials. D 93–22; 1922. Approved by American Standards Assn. as Z11g–1930. Method of Test for Flash Point by means of the Pensky-Martens Closed Tester. For fuel oils, dimensions and design of tester cup, stirring device, air bath, and thermometer, test procedure.

American Society for Testing Materials. D 95–30; 1930. Approved by American Standards Assn. as Z11i–1930. Method of Test for Water in Petroleum Products and Other Bituminous Materials. Especially applicable to petroleum, fuel oil, road oil, coal tar, water-gas tar, coke oven tar, etc. Determination of water by distilling sample with volatile solvent, dimensions and design of still, distillation requirements for solvent, test procedure.

American Society for Testing Materials. D 96–30; 1930. Approved by American Standards Assn. as Z11h–1930. Method of Test for Water and Sediment in Petroleum Products by Means of Centrifuge. May be used for crude mineral oils and fuel oils, a more accurate method given in A. S. T. M. method D 95. Structural requirements and speed of centrifuge, capacity and graduation of centrifuge tube, test procedure.

American Society for Testing Materials. D 129–27; 1927. Approved by American Standards Assn. as Z11m–1928. Method of Test for Sulphur in Petroleum Oils Heavier than Illuminating Oil. By use of oxygen bomb, capacity of bomb, material and dimensions of oil cup and fuse wire, composition of reagents, test procedure.

American Society for Testing Materials. Tentative Test Method. D 156–23T; 1923. Method of test for Color of Refined Petroleum Oil by Means of Saybolt Chromometer. Dimensions and construction of Saybolt Chromometer, test procedure for comparing color of oil with standard color disks.

American Society for Testing Materials. D 158–28; 1928. Methods of Testing Gas Oils. Distillation test method, dimensions of flask, condenser, support, etc., assembly of apparatus, determination of gravity, determination by A. S. T. M. standard methods of sulphur, carbon residue, pour point, viscosity, and water.

American Society for Testing Materials. D 189–30; 1930. Method of Test for Carbon Residue of Petroleum Products (Conradson Carbon Residue). Provides information for engine lubricants, domestic fuel oils, and oils for gas manufacture. Dimensions and construction of test apparatus, test procedure for residue after prescribed application of heat.

American Society for Testing Materials. D 206–25; 1925. Approved by American Standards Assn. as Z11a–1928. Standard Abridged Volume Correction Table for Petroleum Oils. For reducing oil volumes to the basis of 60° F. Based on same data as Table 2, U. S. Bureau of Standards Circular No. 154.

American Society for Testing Materials. D 240–27; 1927. Approved by American Standards Assn. as Z11n–1928. Method of Test for Thermal Value of Fuel Oil. Permissible makes of combustion bombs, requirements for calorimeter jacket, stirring procedure, calibration of thermometers, standardization of calorimeter, filling of bomb, test procedure.

American Society for Testing Materials. Tentative Methods. D 270–30T; 1930. Methods of Sampling Petroleum and Petroleum Products. Dimensions and design of apparatus, sampling procedure for bottle or beaker sampling of tank cars and tanks, continuous sampling of pipe lines, dipper sampling of stream discharge, thief sampling of containers, borings samplings of soft solids, grab sampling of lump material.

American Society for Testing Materials. D 286–30; 1930. Approved by American Standards Assn. as Z11w–1930. Method of Test for Determination of Autogenous Ignition Temperatures. For liquid and semiliquid petroleum products, test procedure by method of dropping sample into flask resting in molten solder bath.

American Society for Testing Materials. Tentative Test Methods. D 287–30T; 1930. Method of Test for Gravity of Petroleum and Petroleum Products by Means of the Hydrometer. Does not include determination of specific gravity for road oils, road tars, asphalt cements and soft tar pitches. Definition of specific gravity and A. P. I. gravity and comparison table, graduation and accuracy requirements of hydrometer and special thermometer, test procedure.

American Society for Testing Materials. Tentative Definitions. D 288–31T; 1931. Definitions of Terms Relating to Petroleum. Includes definitions of crude petroleum, petroleum naphtha, petroleum spirits, kerosene, gas oil, fuel oil, oil shale, end point, engine distillate, etc.

American Wood Preserver's Assn. 40a; 1926. Standard Abridged Volume Correction Table for Petroleum Oils. Based on same data as Table No. 2 of Bureau of Standards Circular No. 154. Table for reducing oil volumes to basis of 60° F. for 6 groups of oils.

Associated Factory Mutual Fire Insurance Companies. Fuel Oil Installations for Furnaces and Engines; 1928. Classification of fuel oils, requirements for oils as regards fire hazards, specifications for steel tanks, their location, installation and piping connections, requirements, regarding tank heating, installation of pumps, automatic valves, oil burner installations, interlocking valves, oil engine installations and exhaust piping with special reference to fire hazards.

New York Produce Exchange. Rules Regulating the Petroleum Trade; 1920. Refined Petroleum. Requirements on burning test and gravity, method of test for burning test.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Method of Rating Fuels for Detonation; 1931. Method of rating gasoline for fuel knock to conform to a series of octane numbers, definition of octane number for a fuel.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C154 and Suppl.; 1924. National Standard Petroleum Oil Tables. Approved by Am. Petroleum Institute and Bureau of Mines. Applies to all petroleum oils, both crude and refined, produced in the U. S., the A. P. I. scale chosen as standard for density measurement. Tables converting observed degrees A. P. I., volume, and specific gravity to corresponding values at 60° F. and tables converting degrees A. P. I. to specific gravity, pounds per gallon, and degrees Baumé.

U. S. Gov., Dept. of Commerce. Bureau of Standards C19; 1924. Standard Density and Volumetric Tables. Includes comparison table of degrees Baumé, degrees A. P. I., pounds per gallon, and specific gravity, also tables for graduation of various types of hydrometers.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Includes methods of test for lubricants and liquid fuels including several A. S. T. M. methods and flock test, wick feed test, sediment, water by centrifuge, emulsion tests, demulsibility, protection test, reaction test, acidity in gasoline, doctor test, corrosion tests, fatty oil.

503.1 BENZINE AND PETROLEUM ETHER

American Oil Chemists' Society. Methods of Chemical Analysis; 1930. Cotton Seed. Includes petrolic ether used in extraction of oil from cotton seed, requirements on distillation range, initial boiling point, end point, non-volatile matter content, and specific gravity of petrolic ether.

National Cottonseed Products Assn. Rules; 1930. Rule 272. Methods of Analysis of Cottonseed Cake, Meal and meats. Includes specifications for petrolic ether used in extraction of oil from the oil cake, meal, or meats. Requirements on distillation range, initial boiling point, end point, nonvolatile matter, and specific gravity.

U. S. Gov., Federal Specifications Board. O–E–751; 1931. Petroleum Ether. For 2 grades, requirements on color, moisture and sediment, boiling point range, residue after evaporation, spot test, acidity, and absence of benzene hydrocarbons, methods of test.

References.—Definitions, methods of sampling and testing. *See also* 503.0.

503.2 DISTILLATES OF PETROLEUM

American Society for Testing Materials. Tentative Specifications. D 235–26T; 1926. Petroleum Spirits (Mineral Spirits). Apply only to petroleum distillates. Requirements for color in accordance with A. S. T. M. test method D 156, for flash point in accordance with A. S. T. M. method D 56, for distillation according to A. S. T. M. D 86, for appearance, test requirements for blackening and acidity.

National Assn. of Dyers and Cleaners. U. S. Bureau of Standards. Commercial Standard CS3–28; 1928. Stoddard Solvent (Dry Cleaning). For a petroleum distillate, requirements on appearance, color, odor, flash point, corrosion test, distillation range, acidity, sulphuric acid absorption test, methods of sampling from cars, drums, and small containers, test methods.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test

Nos. 16, 17, 18, and 19. To Determine Impurities in Dry Cleaning Solvent. Reagents and test procedure for determination of presence of alkali, moisture, sulphur compounds, or benzine soap in dry cleaning solvent.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS3–28; 1928. Stoddard Solvent. A commercial standard for a dry cleaning agent selected and accepted by industry, a petroleum distillate, requirements on appearance, color, odor, flash point, corrosion test, distillation range, acidity, doctor test, and sulphuric acid absorption test, methods of sampling and test.

U. S. Gov., Federal Specifications Board. P–S–661; 1931. Dry Cleaning Solvent. Known in trade as Stoddard Solvent, requirements on appearance, color, odor, flash point, corrosion test, distillation range, acidity, doctor test, sulphuric acid absorption test, methods of test, dimensions of Tag closed tester for flash point, dimensions, graduation, and calibration of test thermometer.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0. Petroleum thinners for paint. *See* 848.7. Benzine, petroleum ether. *See* 503.1. Gasoline and naphtha. *See* 503.3. Kerosene. *See* 503.5. Mineral seal oil. *See* 503.6. Long time burning oil. *See* 503.7. Lubricating oils. *See* 504. Transformer oils. *See* 504.8.

503.3 GASOLINE AND NAPHTHA

American Railway Assn. Signal Section. 13324; 1924. Motor Gasoline. Fuel for motor cars, free from water and suspended matter, test requirements for color, corrosion, distillation range, and sulphur. Based on specification for U. S. Government Motor Gasoline issued by Bureau of Mines of Department of Commerce.

American Society for Testing Materials. D 130–30; 1930. Approved by American Standards Assn. as Z11u–1930. Method of Test for Detection of Free Sulphur and Corrosive Sulphur Compounds in Gasoline. Test procedure using discoloration of copper strip method.

American Society for Testing Materials. D 216–30; 1930. Approved by American Standards Assn. as Z11k–1930. Method of Test for Distillation of Natural Gas Gasoline. Dimensions and design of flask, condenser, shield, support, and thermometer, sampling and test procedure, correction for barometric pressure, accuracy of duplicate results.

American Society for Testing Materials. Tentative Method of Test. D323–31T; 1931. Vapor Pressure of Natural Gasoline (Reid Method). Specifications of test apparatus, method of measurement of vapor pressure.

Natural Gasoline Assn. of America. Tentative Code for Testing Natural Gas for Gasoline Content; 1924. Description and layout of apparatus, test procedure for three methods of testing, compression and cooling method, oil absorption method, and charcoal absorption method.

Natural Gasoline Assn. of America. Natural Gasoline; 1928. Test requirements for 5 grades including gravity, end point, percentage recovery, corrosion, and doctor test, using Bureau of Mines method for doctor test, and modifications of Am. Soc. for Testing Materials methods for corrosion and distillation test.

Natural Gasoline Assn. of America. New Specifications for Natural Gasoline. Effective date Jan. 1, 1932, optional from Jan. 1, 1931, to Jan. 1, 1932. For gasoline extracted from natural gas, requirements on color, doctor test, noncorrosiveness, end point, percentage evaporated at 275° F., division into 24 grades dependent on vapor pressure and percentage evaporated at 140° F., doctor test procedure.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Aviation Gasoline. For fighting grade and for domestic grade, requirements on freedom from water and suspended matter, on color, doctor test, corrosion test, distillation ranges, acidity, and percentage of sulphur, methods of sampling and test.

U. S. Gov., Federal Specifications Board. VV–M–571; 1931. Motor Fuel V. For ambulances, fire engines, military and naval equipment, requirements on freedom from water and suspended matter, on corrosion test, distillation range, vapor pressure, and percentage of sulphur, methods of test given in F. S. B. spec. 2d and A. S. T. M. specs.

U. S. Gov., Federal Specifications Board. VV–G–101; 1931. U. S. Gov. Motor Gasoline. For automobiles, trucks, motor boats, etc., requirements on freedom from water and suspended matter, corrosion test, distillation range, allowable sulphur, vapor pressure, methods of test according to F. S. B. spec. 2d and A. S. T. M.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulations No. 3; 1927, and Appendix of 1930. Industrial Alcohol and Denatured Alcohol. Appendix contains specifications for gasoline approved for use in making completely denatured alcohol, requirements on volatility and distillation range using Navy Dept. spec. No. 7G1 for distillation test method.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, and 503.0. Rating of gasoline for detonation. *See* 503.0. Solvent naphtha (xylene). *See* 801.8.

503.4 FUEL AND GAS OILS

American Oil Burner Assn. Uniform Fuel Oil Specifications. Undated. Requirements for flash point, water and sediment, pour point, distillation test, and some viscosity requirements for five grades of furnace and fuel oils.

National Electric Light Assn. Proceedings, vol. 78; 1922. p. 907. Suggested Specifications. Fuel Oil. Classifies the essential, the desirable, and the contract clauses that should be included in a purchase specification, explanation of the value of each, no specific figures or amounts stated.

New York Produce Exchange. Rules Regulating the Petroleum Trade; 1920. Rule 23. Fuel Oil. Pour test requirement.

New York Produce Exchange. Rules Regulating the Petroleum Trade; 1920. Rule 23. Gas Oil. Defined as a distillate of petroleum oil of 23°B.

Underwriters' Laboratories. Fuel Oil Burners for Domestic Use; 1928. Flash point requirements for fuel oil, requirements on assembly and operation of burners, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS12–29; 1929. Domestic and Industrial Fuel Oils. A commercial standard selected and accepted by industry covering 3 grades of oil for domestic oil burners and 3 grades for industrial oil burners, requirements on freedom from foreign matter, flash point, pour point, viscosity, permissible water and sediment, with distillation test for domestic grades.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B). Lubricants and Liquid Fuels. Bunker Oil. For 3 grades of oil dependent on viscosity, may be used in Diesel engines, requirements on freedom from grit, acid, and foreign matter, on flash point, viscosity, and allowable water and sediment, test methods.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Fuel Oil (Navy Standard). A high-grade fuel oil, may be used in Diesel engines. Requirements on freedom from grit, acid, and foreign matter, on flash point, viscosity, percentage of sulphur and of water and sediment allowed, test methods.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0. Gasoline and naphtha. *See* 503.3. Kerosene. *See* 503.5.

503.5 KEROSENE AND SIMILAR ILLUMINATING OILS

American Railway Assn. Signal Section. 1911; 1911. Illuminating Oil. Requirements for flash point, burning point, specific gravity, color, neutrality, and burning in lamp.

American Society for Testing Materials. D 187–30; 1930. Approved by American Standards Assn. as Z11q–1930. Method of Test for Burning Quality of Kerosene Oils. Dimensions of standard brass Saybolt test lamp, Miller No. 2 burner, chimney, and wick, trimming of wick, test procedure.

U. S. Gov., Federal Specification Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Kerosene. For illuminating oil free from water, glue, and suspended matter, requirements on color, flash point, amount of sulphur, distillation end point, cloud point, burning test, and methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0. Mineral seal oil. *See* 503.6. Long time burning oil. *See* 503.7. Gasoline and naphtha. *See* 503.3.

503.6 MINERAL SEAL OIL

American Society for Testing Materials. D 239–30; 1930. Approved by American Standards Assn. as Z11r–1930. Method of Test for Burning Quality of Mineral Seal Oil. Using Dressel No. 520 side lamp, dimensions of font, burner and chimney, test procedure.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. 300° Mineral Seal Oil. For a high flash illuminant for passenger coaches, free from water, glue, and suspended matter, requirements on color, flash point, flock test, cloud point, reaction, and burning test, test methods.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0.

503.7 LONG-TIME BURNING (SIGNAL) OIL

American Society for Testing Materials. D 219–30; 1930. Approved by American Standards Assn. as Z11s–1930. Method of Test for Burning Quality of Long-Time Burning Oil for Railway Use. Using standard Am. Rwy. Assn. semaphore lamp, dimensions of burner, dimensions of chimney, material and dimensions of wick, test procedure.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines, Tech. Paper 323B.) Lubricants and Liquid Fuels. Long-Time Burning Oil. For oil free from water, glue, and suspended matter, requirements on color, flash point, amount of sulphur, flock test, end point, cloud point, doctor test, and burning test, test methods.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0

504. LUBRICATING OILS, INSULATING OILS, AND GREASES (INCLUDES PARAFFIN OIL)

References.—Animal oils and greases. *See* 040–043. Vegetable oils. *See* 142.

504.0 GENERAL ITEMS

American Assn. of State Highway Officials. Tentative Method. T–72. Undated. Methods of Test for Viscosity of Petroleum Products and Lubricants. Same as D 88–30 of Am. Soc. for Testing Materials.

American Chemical Society. Standard Methods for the Sampling and Analysis of Commercial Fats and Oils; 1926. Published by American Oil Chemists Society. Applicable to lubricating oils, fats and fatty oils for candles, methods of sampling from different types of containers, apparatus and methods of determination of moisture volatile matter, insoluble impurities, soluble mineral matter, fatty acids combined as mineral soap, free fatty acids, titer, unsaponifiable matter, iodine number, saponification number, melting point, softening point, slipping point, flow test, cloud test, bleach test, Teichert-Meissl and Polenske numbers, Kirschner value, index of refraction, specific gravity, acetyl value, open-cup flash and fire test, standard color for commercial fat.

American Society of Mechanical Engineers. Power Test Codes. Instruments and Apparatus, Part 17; 1930. Determination of the Viscosity of Liquids. General procedure in making viscosity determinations, precautions recommended in taking readings, description, relative advantages, range and accuracy, test procedure, corrections and calibration for various types of viscosimeters.

American Society for Testing Materials. D 88–30; 1930. Approved by American Standards Assn. as Z11b–1930. Methods of Test for Viscosity of Petroleum Products and Lubricants. Use of Saybolt universal viscosimeter for lubricants and of Saybolt Furol viscosimeter for fuel oils, dimensions of oil tubes, dimensions and graduation of thermometer, temperatures for making determinations, test procedure.

American Society for Testing Materials. Tentative Test Method. D 91–30T; 1930. Method of Test for Precipitation Number of Lubricating Oils. Commonly used for steam cylinder stocks and black oils, measurement of precipitate when a mixture of lubricating oil and petroleum naphtha are centrifuged, requirements for centrifuge and centrifuge tubes, gravity, distillation and aniline requirements for the petroleum naphtha diluent, test procedure.

American Society for Testing Materials. D 92–24; 1924. Approved by American Standards Assn. as Z11f–1928. Method of Test for Flash and Fire Points by Means of Open Cup. For all products except fuel oil having open cup flash below 175° F., dimensions and design of Cleveland open cup and of thermometer, dimensions of test flame, test procedure.

American Society for Testing Materials. D 94–28; 1928. Approved by American Standards Assn. as Z11t–1930. Method of Test for Saponification Number. Useful in identification of unmixed animal and vegetable oils and for measuring quantity of fatty material in compounded products, apparatus and preparation of reagents, test procedure for saponification number and percentage of fatty oil.

American Society for Testing Materials. D 95–30; 1930. Approved by American Standards Assn. as Z11i–1930. Method of Test for Water in Petroleum Products and Other Bituminous Materials. Especially applicable to petroleum, fuel oil, road oil, coal tar, water-gas and coke oven tars, etc. Determination of water by distilling sample with volatile solvent, dimensions and design of still, distillation requirements for solvents, test procedure.

American Society for Testing Materials. D 128–27; 1927. Approved by American Standards Assn. as Z11p–1928. Method of Analysis of Grease. Methods for determination of fillers, ash, soap bases, soap, fat, water, excess alkali or acid, petroleum products, and unsaponifiable matter, qualitative tests for glycerine, preparation of solvents.

American Society for Testing Materials. Tentative Test Method. D 155–23T; 1923. Method of Test for Color of Lubricating Oils by Means of Union Colorimeter. Dimensions and construction of Union Colorimeter, dimensions of standard glass test jar, list of 15 standard colors with Lovibond analysis, test procedure for lubricating oils in general and for cylinder oils.

American Society for Testing Materials. D 157–28; 1928. Approved by American Standards Assn. as Z11o–1928. Steam Emulsion of Lubricating Oils. Dimensions, design and assembly of apparatus, test temperatures, test procedure, determination of steam emulsion number as time in seconds for oil to separate from the emulsion produced under the test conditions.

American Society for Testing Materials. Tentative Test Method. D 188–27T; 1927. Approved as tentative standard by Am. Standards Assn. under designation Z11l–1928. Method of Test for Neutralization Number of Petroleum Products and Lubricants. For indicating presence of organic acids and contamination by alkalies and mineral acids, preparation of reagents, procedure for compounded and noncompounded petroleum products.

American Society for Testing Materials. D 189–30; 1930. Method of Test for Carbon Residue of Petroleum Products (Conradson Carbon Residue). Provides information for engine lubricants, domestic fuel oils, and oil for gas manufacture. Dimensions and construction of test apparatus, test procedure for residue after prescribed application of heat.

American Society for Testing Materials. Tentative Test Method. D 217–27T; 1927. Approved as tentative by American Standards Assn. under designation Z 11c–1928. Method of Test for Penetration of Greases and Petrolatum. For measuring the original consistency or the worked consistency of No. 0 cup grease and all harder greases and of unworked petrolatum, test procedure using asphalt penetrometer with special cone tip, dimensions and design of grease worker for use in testing worked consistency.

American Society for Testing Materials. Tentative Methods. D 270–30T; 1930. Methods of Sampling Petroleum and Petroleum Products. Dimensions and design of apparatus, sampling procedure for bottle or beaker sampling of tank cars and tanks, continuous sampling of pipe lines, dipper sampling of stream discharge, thief sampling of containers, borings sampling for wax and soft solids, grab sampling for loose lumpy materials.

American Society for Testing Materials. Tentative Test Methods. D 287–30T; 1930. Method of Test for Gravity of Petroleum and Petroleum Products by means of the Hydrometer. Does not include determination of specific gravity for road oils, road tars, asphalt cements and soft tar pitches. Definition of specific gravity and of A. P. I. gravity and comparison table, graduation and accuracy requirements of hydrometer and special thermometer, test procedure.

American Society for Testing Materials. Tentative Method of Test. D322–30T; 1930. Test for Dilution of Crankcase Oils. Specifications for test apparatus, test procedure for measurement of dilution of crankcase oil when gasoline has been used as fuel in gasoline engines.

American Society for Testing Materials. D 97–30; 1930. Approved by American Standards Assn. as Z11e–1930. Cloud and Pour Points of Petroleum Products. Definition of cloud point on cooling of transparent oils and of pour point on cooling of other oils, dimensions and assembly of test apparatus, dimensions and graduation of low range thermometers, test procedure.

American Wood Preservers Assn. 40a; 1926. Standard Abridged Volume Correction Table for Petroleum Oils. Based on same data as Table 2 of Bureau of Standards Circular No. 154. Table for reducing oil volumes to basis of 60° F. for 6 groups of oils.

504.1 SPECIAL LUBRICATING OILS

504.11 Heavy Asphaltic Lubricating Oils

504.12 Lubricating Oils for Car Axle Generators

504.13 Journal Box Lubricating Oils

American Railway Assn. Mechanical Div. Recommended Practice; 1930. New Car Oil. Requirements on flash point, viscosity, pour point, and percentage of water, using A. S. T. M. test methods, requirements on allowable tarry matter and insoluble impurities using methods specified, for summer grade and for winter grade oils.

American Railway Assn. Mechanical Div. Reclaimed Oil; 1930. For use in lubricating car journals, requirements on flash and fire points, viscosity, pour point, precipitation number of sediment, percentage of water, and screening.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Car and Locomotive Engine Oil. A journal lubricant, requirements on flash point, viscosity, pour point, and precipitation number, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0.

504.14 Mineral Lubricating Oils

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0. Journal-box oil. *See* 504.13. Misc. lubricating oils. *See* 504.19. Cylinder and engine oils. *See* 504.2. Machine lubricating oils. *See* 504.3. Paraffin oil. *See* 504.53. Transformer and switch oils. *See* 504.8.

504.19 Miscellaneous Lubricating Oils

American Railway Assn. Signal Section. 10220; 1921. Zero Fahrenheit Lubricating Oil. For signal mechanisms, but not for relays or dash pots, test requirements for flash point, fire point, viscosity, pour at zero, moisture, and acid, oil to be neutral and free from vegetable or animal oils or fats, free from alkali.

American Railway Assn. Signal Section. 10320; 1921. 45° Below Zero Fahrenheit Lubricating Oil. For signal mechanisms, not for dash pots, neutral, free from vegetable and animal oils and fats and alkali, test requirements for flash point, fire point, viscosity, pour at −45° F., moisture, and acid.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Gear, Chain, and Wire Rope Lubricant. A petroleum product free from foreign admixtures, requirements on viscosity and on protective qualities, methods of test.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Gun and Ice Machine Oil. Includes oil for small arms, for 2 grades, requirements on flash point, viscosity, pour point, neutralization number, corrosion and emulsion test, demulsibility, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0.

504.2 CYLINDER OILS

504.21 Compressor Oil, for Air and for Ammonia Compressors

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Gun and Ice Machine Oil. For small arms, for cylinders of ice machines, pneumatic tools, and hydraulic systems, a refined petroleum without foreign admixtures, for 2 grades, requirements on flash point, viscosity, pour point, neutralization number, corrosion and emulsion test, demulsibility, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0.

504.22 Engine Oils, for Steam Engine Cylinders and for Turbines

National Electric Light Assn. Proceedings, vol. 78; 1922. p. 903. Proposed Specifications. Steam Turbine Oils. For lubrication of horizontal turbines provided with a circulating and forced feed system, requirements on general quality, flash and fire points, viscosity, color, pour test, acidity, corrosion test, emulsion test, carbonization, distillation, methods of test, for 3 gravity grades.

Society of Automotive Engineers, 1931 Handbook. Recommended Practice. Crankcase Lubricating-Oil Viscosity Numbers; 1930. For 7 oil grades, assigned viscosity numbers and corresponding Saybolt viscosity range at specified temperatures.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Lubricants, Class C. A refined petroleum oil suitable for both turbine and internal combustion engines. For 5 grades, free from foreign admixtures, requirements on flash and fire points, viscosity, color, pour point, neutralization number, corrosion test, emulsion test, demulsibility, test methods.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Lubricants, Class B. For lubrication of turbines, dynamos, and high speed steam engines, using circulating and forced feed systems. For 5 grades free from foreign admixtures, requirements on flash and fire points, viscosity, color, pour point, corrosion test, emulsion test, demulsibility, test methods.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Lubricants, Class A. Refined petroleum oil for general lubrication of engines and machinery, but not for steam cylinders. For 5 grades free from foreign admixtures requirements on flash and fire points, viscosity, color, pour point, reaction chemically, corrosion test, test methods.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Mineral Steam-Cylinder Oil for Noncondensing Engines. For 2 grades of well refined petroleum oil, requirements on flash point, viscosity, pour point, precipitation number, and carbon residue, methods of test.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Compounded Steam-Cylinder Oil for Noncondensing Engines. Permissible amount of fatty oil, requirements on flash point, viscosity, pour point, precipitation number, and neutralization number, methods of test.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Marine-Engine Oil. Not for circulating or forced feed systems, a mineral oil free from water, mineral acids, alkalies and asphaltic matter, requirements on viscosity, pour point, neutralization number, flash and fire points, corrosion, emulsion, and wick feed tests, test methods.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Compound Marine-Engine Oil. For marine reciprocating engines, but not for use in circulating or forced feed lubricating systems, a refined petroleum oil compounded with a rapeseed or peanut oil, requirements on percentage limits of rapeseed oil, on viscosity, pour point, neutralization number, corrosion test, emulsion test, wick feed test, methods of test, for two grades.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0.

504.23 Cylinder Oils, for Internal Combustion Engines

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Lubricants, Class C. A refined petroleum oil suitable for both turbine and internal combustion engines. For 5 grades, free from foreign admixtures, requirements on flash and fire points, viscosity, color, pour point, neutralization number, corrosion test, emulsion test, demulsibility, test methods.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Lubricants, Class D. For uncompounded petroleum oils for lubricating internal combustion engines, except aircraft and Diesel engines. For 9 grades, requirements on flash and fire points, viscosity, color, pour point, neutralization number, corrosion test, and carbon residue, test methods.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Liberty Aero Oil. For stationary-cylinder aircraft engines, a refined petroleum oil without foreign admixtures, for 4 grades, requirements on flash point, viscosity, pour points, neutralization number, emulsion test, carbon residue, and precipitation number, methods of test.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Diesel Engine Lubricating Oil. A refined petroleum oil free from admixtures, requirements on flash point, viscosity, pour point, neutralization number, emulsion test, and carbon residue, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 502.2. 503.0, 504.0. Auto engine crank-case oil. *See* 504.34.

504.24 Valve Oils

504.3 MACHINE OILS

504.31 Oils for Dynamos, Spindles, Pumps, etc.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Gun and Ice Machine Oil. For small arms, for cylinders of ice machines, pneumatic tools, and hydraulic systems, a refined petroleum without foreign admixtures, 2 grades, requirements on flash point, viscosity, pour point, neutralization number, corrosion and emulsion test, demulsibility, methods of test.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Lubricants, class A. Refined petroleum oil for general lubrication of engines and machinery, but not for steam cylinders. For 5 grades free from foreign admixtures requirements on flash and fire points, viscosity, color, pour point, reaction chemically, corrosion test, test methods.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0.

504.32 Machine-Gun Oil

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Aircraft Machine Gun Oil. For refined petroleum oil without foreign admixtures, requirements on flash point, viscosity, pour point, neutralization number, corrosion number, and carbon residue, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0.

504.33 Recoil and Recuperator Oils for Guns

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Recuperator Oil and Grease. For recoil mechanism on 75 and 155 mm French gun. The recuperator oil is the same as the recoil oil specified under this specification.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Recoil Oil. For recoil cylinder of gun carriages of War Dept., a refined petroleum oil free from foreign admixtures, in 3 grades, requirements on flash and fire points, viscosity, color, pour point, neutralization number, and corrosion test, methods of test.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Buffer Oil for Recoil and Recuperator Cylinders of All British Types of Howitzers and Gun Carriages. For refined petroleum oil without foreign admixtures, requirements on flash point, viscosity, pour point, and neutralization number, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0. Recuperator grease. *See* 504.49.

504.34 Transmission and Crankcase Oil for Automobiles

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Crankcase Lubricating-Oil Viscosity Numbers; 1930. For 7 oil grades, assigned viscosity numbers and corresponding Saybolt viscosity range at specified temperatures.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Transmission and Rear Axle Lubricant Viscosity Numbers; 1931. A classification of lubricants into 5 classes in terms of viscosity and consistency at low temperatures.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Transmission Oil. For transmission gears of motor vehicles, a petroleum product without foreign admixtures, requirements on ash and viscosity, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0. Engine oil for internal combustion engines. *See also* 504.23.

504.35 Typewriter, Sewing Machine, and Clock Oils

504.36 Oil for Door Closers and Door Checks

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Door Closers. Liquid for door closers, requirements on viscosity, pour point, permissible acidity.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0.

504.4 LUBRICATING GREASES

504.41 Cup Greases

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Graphite Lubricating Grease. Covers 3 grades of cup grease for lubricating motor equipment and machinery and for ball and roller bearings, a mixture of mineral oil, graphite, and lime soap, free from fillers and impurities, requirements on percentage of water, penetration, corrosion test, and composition, methods of test.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Mineral Lubricating Grease. Covers 3 grades of cup grease for lubricating motor equipment and machinery and for ball and roller bearings, a mixture of mineral oil and lime soap free from fillers and impurities, requirements on percentage of water, penetration, corrosion test, composition, test methods.

References.—Definitions, methods of sampling and of testing. *See also* 504.0.

504.42 Cylinder Greases

504.43 Gear, Chain, and Wire Rope Greases

American Mining Congress. American Standards Assn. M 11–1927. Wire Ropes for Mines. Includes lubrication and lubricant for wire ropes, recommendations as to general quality of lubricant.

References.—Definitions, methods of sampling and of testing. *See also* 504.0. Liquid lubricant for gear, chain, and wire rope. *See* 504.19.

504.44 Graphite Greases

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Graphite Lubricating Grease. Covers 3 grades of cup grease for lubricating motor equipment and machinery and for ball and roller bearings, a mixture of mineral oil, graphite, and lime soap, free from fillers and impurities, requirements on percentage of water, penetration, corrosion test, and composition, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 504.0.

504.46 Crank Pin, Driving Journal, and Rod Cup Greases

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Crank Pin Grease, Driving Journal Compound, Rod-Cup Grease. For use on locomotives, composed of soda soap and refined cylinder stock petroleum oil, noncrumbling, requirements on color, soap content, percentage of free alkali, of water, glycerin, and impurities, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 504.0.

504.49 Miscellaneous Lubricating Greases

Society of Automotive Engineers, 1931 Handbook. Recommended Practice. Transmission and Rear Axle Lubricant Viscosity Numbers; 1931. A classification of lubricants into 5 classes in terms of viscosity and consistency at low temperatures.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Recuperator Oil and Grease. For recoil mechanism on 75 and 155 mm French gun carriages, the grease composed of calcium soap, animal or vegetable oils and mineral oil, permissible percentage of water, requirements on penetration, corrosion test, and composition, test methods.

References.—Definitions, methods of sampling and of testing. *See also* 504.0.

504.5 PARAFFIN, PARAFFIN OIL, AND PARAFFIN WAX

504.51 Candles

504.52 Illuminating Wax

504.53 Paraffin Oils

U. S. Pharmacopoeial Convention (Inc). Pharmacopoeia of U. S. A.; 1926. Liquid Petrolatum (White Mineral Oil, Paraffin Oil.) Physical properties, identity tests, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0. Petrolatum. *See also* 504.6.

504.54 Paraffin Wax

American Society for Testing Materials. D 87–22; 1922. Approved by American Standards Assn. as Z11d–1928. Method of Test for Melting Point of Paraffin Wax. Definition of A. S. T. M. paraffin wax melting point, dimensions and design of container, air bath, water bath, stirrer, and thermometer, test procedure.

American Society for Testing Materials. Tentative Test Methods. D 308–29T; 1929 Method of Test for Expressible Oil and Moisture in Paraffin Waxes. Test procedure using press method, requirements for press, platens and accessories.

New York Produce Exchange. Rules of Transactions in Vegetable Oils, Waxes and Fats; 1924. Paraffin Wax. White crude wax on basis of 2 per cent oil and moisture content, yellow crude wax on basis of 4 per cent oil and moisture content, sold on basis of color and guaranteed melting point.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Paraffin. Physical properties, identity tests, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Definitions, methods of sampling and of testing. *See also* 504.0.

504.6 PETROLATUM

American Railway Assn. Signal Section. 7719; 1920. Petrolatum for Use in Impedance Bonds. A pure mineral oil free from crystalline wax, acid, alkali, solidifying at 120° F., requirements for specific gravity, flash point, viscosity, melting point, solidifying point.

American Society for Testing Materials. D 127–30; 1930. Approved by American Standards Assn. as Z11v–1930. Method of Test for Melting Point of Petrolatum. Apparatus and test procedure for determination of temperature where petrolatum is sufficiently fluid to drop from thermometer bulb.

American Society for Testing Materials. Tentative Test Methods. D 218–25T; 1925. Method of Test for Color of Petrolatum by Means of Union Colorimeter. Dimensions and construction of Union Colorimeter and glass test jar, list of 15 standard colors and Lovibond analysis, test procedure.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Petrolatum (Petroleum Jelly), Liquid Petrolatum (White Mineral Oil, Paraffin Oil). Physical properties, identity tests, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0. Liquid petrolatum. *See also* 504.53.

504.7 CUTTING OILS

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Soluble Cutting Oil. For cooling and lubricating cutting and threading tools, a mixture free from mineral acids, sediment, etc., requirements on non clogging qualities, emulsion forming qualities with water, water content, emulsion test, ash, and corrosion test, methods of test.

U. S. Gov., Federal Specifications Board. 2d; 1927. (Bureau of Mines Tech. Paper 323B.) Lubricants and Liquid Fuels. Compounded Cutting Oil (Mineral Lard Oil). For lubricating and cooling machine cutting tools where a soluble oil is not suitable, a solution of refined mineral oil and lard oil, requirements on freedom from rancidity and foreign matter, nongumming, soluble and oily in kerosene or soda and water mixtures, color, flash point, viscosity, pour point, percentages of fatty oil, free fatty acid, water, and sediment, methods of test.

References.—Definitions, methods of sampling and of testing for lubricating oils. *See also* 504.0. Definitions, methods of sampling and of testing for animal oils and fats. *See also* 040. Other lard oils. *See* 041.3.

504.8 TRANSFORMER AND SWITCH INSULATING OILS

American Railway Assn. Signal Section. 4631; 1931. Transformer Oil. Fractionally distilled from petroleum, free from moisture, acid, and alkali, flash point, fire test, pour test, permissible acidity, and viscosity requirements, electrical breakdown voltage test requirements.

American Society for Testing Materials. D 117–31; 1931. Methods of Testing Electrical Insulating Oils. Dimensions and design of sampling apparatus and sampling procedure, apparatus, reagents, and test procedure for determination of sulphur, dielectric strength test procedure, other tests for flash point, pour point, neutralization number, and mineral acids according to A. S. T. M. standard methods.

National Electrical Mfrs. Assn. Handbook of Apparatus Standards; 1928. Transformers for Distribution and Power Service. Transformer oil; 1921. Dielectric test requirements for transformer oil.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 503.0, 504.0.

504.9 MISCELLANEOUS OILS

References.—Castor oil for medicinal purposes. *See* 813.1. Cottonseed oil. *See* 142.4.

505. ASPHALT AND OTHER BITUMINOUS MATERIALS

505.0 GENERAL ITEMS

American Assn. of State Highway Officials. Tentative Method. T–30. Undated. Method of Mechanical Analysis of Extracted Aggregates. For mineral aggregate left after extraction of bituminous materials, drying and screen grading procedure.

American Assn. of State Highway Officials. Tentative Method. T–40. Undated. Methods of Sampling Bituminous Materials. Same as D 140–25 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–41. Undated. Methods of

Sampling Bituminous Mixtures. Method of cutting sample from finished pavement or of taking sample during preparation of mixture.

American Assn. of State Highway Officials. Tentative Method. T–43. Undated. Methods of Test for Specific Gravity of Bituminous Materials. Test procedure for hydrometer method for thin fluids, pycnometer method for viscous fluids and semisolids, displacement method for hard solids and for semisolids.

American Assn. of State Highway Officials. Tentative Method. T–44. Undated. Method of Test for Percentage of Bitumen (Soluble in Carbon Disulphide). Requirements on type of test apparatus and test procedure.

American Assn. of State Highway Officials. Tentative Method. T–45. Undated. Method of Test for Percentage of Bitumen Insoluble in Carbon Tetrachloride. Requirements on type of test apparatus and method of procedure.

American Assn. of State Highway Officials. Tentative Method. T–46. Undated. Method of Test for Percentage of Bitumen Insoluble in Paraffin Naphtha. Requirements on test apparatus and test procedure.

American Assn. of State Highway Officials. Tentative Method. T–47. Undated. Method of Test for Loss on Heating of Oil and Asphaltic Compounds. Same as D 6–30 of Am. Soc. for Testing Materials except that T–47 permits use of a 2-ounce can and adds a test for loss at 100° C.

American Assn. of State Highway Officials. Tentative Method. T–48. Undated. Method of Test for Flash and Fire Points by Means of Open Cup. Same as D 92–24 of Am. Soc. for Testing Materials except that T–48 includes test with the Gill style cup in addition to Cleveland cup and test procedure applies to oils with flash points below 158° F. instead of 175° F.

American Assn. of State Highway Officials. Tentative Method. T–49. Undated. Method of Test for Penetration of Bituminous Materials. Same as D 5–25 of Am. Soc. for Testing Materials except that the use of a Roberts No. 2 needle is permitted in T–49.

American Assn. of State Highway Officials. Tentative Method. T–50. Undated. Method of Float Test for Bituminous Materials. Same as D 139–27 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–51. Undated. Method of Test for Ductility of Bituminous Materials. Same as D 113–26T of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–53. Undated. Method of Test for Softening Point of Bituminous Materials (Ring and Ball Method). Same as D 36–26 of Am. Soc. for Testing Materials except that the simultaneous use of more than one ring is allowed in T–53.

American Assn. of State Highway Officials. Tentative Method. T–54. Undated. Method of Test for Specific Viscosity. For fluid bituminous road materials, test procedure using Engler viscosimeter.

American Assn. of State Highway Officials. Tentative Method. T–55. Undated. Method of Test for Water in Petroleum Products and Other Bituminous Materials. Same as D 95–30 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–56. Undated. Method of Test for Percentage of Residue of Desired Penetration. For oils, method of determination by trial by evaporating samples of oil.

American Assn. of State Highway Officials. Tentative Method. T–57. Undated. Calcium Chloride Method for Determination of Percentage of Water in Bituminous Emulsions (not applicable to clay emulsions). Test procedure for separating and measuring asphalt.

American Assn. of State Highway Officials. Tentative Method. T–58. Undated. Method for Examination of Bituminous Mixtures. Procedure for centrifugal method and for hot extraction method, with suggested method for examination of bituminous mortars.

American Assn. of State Highway Officials. Tentative Method. T–59. Undated. Methods of Testing Bituminous Emulsions. Same as D 244–28T of Am. Soc. for Testing Materials.

American Society of Mechanical Engineers. Power Test Codes. Instruments and Apparatus, Pt. 16; 1931. Density Determinations. For solids, procedure for density determination by measuring and weighing, by picnometer, and by hydrostatic weighing methods. For liquids, procedure for density determination by picnometer, hydrostatic weighing, hydrometer, and Westphal balance methods.

American Society for Testing Materials. D 4–27; 1927. Method of Test for Determination of Bitumen. Apparatus required, preparation of sample, test procedure, method No. 1 for the usual sample, method No. 2 where mineral residue is not easily retained on filter. Approved by American Standards Assn. as A37c–1930.

American Society for Testing Materials. D 5–25; 1925. Method of Test for Penetration of Bituminous Materials. Dimensions and construction of container and needle, water bath standard temperature, preparation of sample, test procedure. Approved by American Standards Assn. as A37a–1930.

American Society for Testing Materials. D 6–30; 1930. Method of Test for Loss on Heating of Oil and Asphaltic Compounds. Dehydration of test sample, limiting dimensions and structural requirements for test oven, dimensions, graduation, standardization, and permissible error of mercury thermometer, test procedure.

American Society for Testing Materials. D 20–30; 1930. Method of Test for Distillation of Bituminous Materials Suitable for Road Treatment. Dimensions and design of distilling flask, glass condenser tube, metal shield, total immersion thermometer, assembly of apparatus, test procedure.

American Society for Testing Materials. D 36–26; 1926. Method of Test for Softening Point of Bituminous Materials. Dimensions, design, and material for test ring, ball, container, and thermometer, preparation of sample, assembly of apparatus, test procedures for soft and for hard materials.

American Society for Testing Materials. D 61–24; 1924. Method of Test for Softening Point of Tar Products. Cube in water method, dimensions, design, and material of sample, hook, container, and thermometer, assembly of apparatus and test procedure for ordinary pitches and for soft pitches.

American Society for Testing Materials. D 70–27; 1927. Method of Test for Specific Gravity of Road Oils, Road Tars, Asphalt Cements and Soft Tar Pitches. Dimensions and weight of pycnometer or weighing bottle, test procedure.

American Society for Testing Materials. D 71–27; 1927. Method of Test for Specific Gravity of Asphalts and Tar Pitches Sufficiently Solid to Be Handled in Fragments. Determination by use of analytical balance, preparation of specimen, test procedure.

American Society for Testing Materials. Tentative Test Method. D 113–26T; 1926. Method of Test for Ductility of Bituminous Materials. Dimensions of specimen mold, requirements for water bath, test procedure in pulling specimen for measurement of ductility.

American Society for Testing Materials. D 139–27; 1927. Method of Float Test for Bituminous Materials. Weight and dimensions of aluminum float and of brass collar, assembly of apparatus, design and graduation of thermometer, preparation of sample and test procedure for asphalt products and for tar products. Approved by American Standards Assn. as A37b–1930.

American Society for Testing Materials. D140–25; 1925. Methods of Sampling Bituminous Materials. Methods of sampling from bulk storage and during loading at factory, sampling from tank cars, distributors, and from drums of solid or semisolid material at point of delivery.

American Society for Testing Materials. D 146–27; 1927. Methods of Testing Felted and Woven Fabrics Saturated with Bituminous Substances for Use in Waterproofing and Roofing. Sampling, inspection for weight and dimensions, test procedure for moisture, strength, pliability, absorption, volatility of asphalt, extraction and distillation of coal tar products, desaturation of fabric, weight and ash determinations.

American Society for Testing Materials. D 147–27; 1927. Methods of Testing Bituminous Mastics, Grouts and Like Mixtures. Definitions of bituminous grout, asphalt mastic, and asphalt mastic cake, preparation of samples, design and dimensions of test apparatus, test procedure for analysis of 10 to 30 gram samples and for analysis of 50 to 500 gram samples.

American Society for Testing Materials. D 165–27; 1927. Method of Test for Determination of Proportion of Bitumen Soluble in Carbon Tetrachloride. List of apparatus, preparation of sample, preparation of Gooch crucible, test procedure.

American Society for Testing Materials. Tentative Test Method. D 243–28T; 1928. Method of Test for Residue of Specified Penetration. Applies to the evaporation of a road oil or semisolid asphalt at a temperature of 249° to 260° C. until a residue of the specified penetration is obtained and calculating the residue as a percentage of original sample, dimensions of sample container, thermometer design and graduation, test procedure.

American Society for Testing Materials. Tentative Test Methods. D 244–28T; 1928. Methods of Testing Bituminous Emulsions. For emulsified light oils for dust laying purposes and for emulsified asphaltic materials suitable for construction or repair with or without considerable mineral matter. Test procedure for miscibility with water, stone coating test, percentage of water by distillation process.

American Society for Testing Materials. D 255–28; 1928. Method of Test for Steam Distillation of Bituminous Protective Coatings. General method for separation and recovery of solvent and base in bituminous mixtures, description and assembly of test apparatus, test procedure.

American Society for Testing Materials. Tentative Recommended Practice. D 290–28T; 1928. Bituminous Paving Plant Inspection. Duties of inspector, collecting of samples, control of mixtures, conducting plant-laboratory tests.

American Society for Testing Materials. Tentative Test Method. D 313–29T; 1929. Method of Test for Coarse Particles in Bituminous Materials by Means of Elutriation. Test procedure for dissolving sample in successive solvents and measuring sediment, sampling according to A. S. T. M. method D 140.

American Society for Testing Materials. Tentative Methods. D 270–30T; 1930. Methods of Sampling Petroleum and Petroleum Products. Dimensions and design of apparatus, sampling procedure for bottle or beaker sampling of tank cars and tanks, continuous sampling of pipe lines, dipper sampling of stream discharge, thief sampling of containers, borings sampling of wax and soft solids, grab sampling of loose lumpy materials.

Asphalt Shingle and Roofing Institute. Recommended Tests. Mill Analysis of Bituminous Roofings; 1922. Size of samples of original felt and of felts after saturation and after saturation and coating, test procedure and calculations for determination of weight, moisture, ash, saturation, weight of coating, mineral surfacing, and dust surfacing.

Asphalt Shingle and Roofing Institute. Discoloration Test for Coatings; 1922. For testing whether the roofing felt coating will discolor the talc surfacing on aging by an accelerated test on asphalt sprinkled with calcium carbonate and heated.

Asphalt Shingle and Roofing Institute. Tentative Recommended Methods of Testing. Bituminous Materials; 1921. For melting point the A. S. T. M. ball and ring method D 36 is shown and recommended. For penetration the A. S. T. M. method D 5 is recommended and shown. For solubility in carbon-disulphide a short method is shown, for a long and more accurate method the A. S. T. M. method D 4 is recommended and shown. For loss on heating the A. S. T. M. method D 6 is recommended and shown. For flash point the Bureau of Mines Bulletin No. 5. p. 25, is recommended and shown, "Report of Committee on Standardization of Petroleum Specifications." Dimensions and design of Cleveland open cup tester and of special thermometer, assembly of apparatus and test procedure.

Asphalt Shingle and Roofing Institute. Ductility of Coatings; 1921. Dimensions and design of specimen mold, preparation of specimen, testing procedure for pulling apart and measuring elongation under specified temperature.

Asphalt Shingle and Roofing Institute. Tentative Recommended Methods of Testing. Bituminous Materials; 1921. Viscosity of Saturation. Method of recording the time required for the first 50 cc to flow through an Engler viscosimeter at 350° F. as described in Bulletin 691 of U. S. Dept. of Agriculture in specifications for road materials. Illustration of apparatus, test procedure.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R4; 1926. Asphalt. Simplified practice recommended and accepted by industry establishing a limited list of varieties of paving asphalt, defining penetration range for each variety for asphalt used in construction of sheet asphalt, asphaltic concrete, and asphalt macadam pavements, and for use in joint filler.

505.1 ASPHALTS

505.11 Native Asphalt

U. S. Gov., Federal Specifications Board. SS–A–706; 1931. Asphalt for Use in Road and Pavement Construction. Covers 14 grades of petroleum asphalt and of fluxed native asphalt, portion of country and type of traffic to which each grade is applicable, requirements on specific gravity, flash point, softening point, penetration, ductility, volatility, and bitumen content, using methods of test of A. S. T. M.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0.

505.12 Asphalt Pavements

References.—Asphalt pavements. *See* 518.37.

505.13 Asphalt Cement

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Asphalt for Bituminous Carpets. For concrete or wood bridge floors, use of either spec. M–21 or M–23 of A. A. S. H. O. for asphalt cement, with special requirements on specific gravity and penetration.

American Assn. of State Highway Officials. Tentative Specifications; M–20. 1926. Asphalt Cement (prepared from petroleum). For penetration grades 30 to 40, 40 to 50, 50 to 60, 60 to 70. Requirements for freedom from water, penetration, total bitumen, soluble bitumen, ductility, flash point, volatility, sampling and testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Specifications. M–21; 1926. Asphalt Cement (prepared from petroleum). For penetration grades 85 to 100, 100 to 120, 120 to 150. Requirements on freedom from water, penetration, total bitumen, soluble bitumen, ductility, flash point, volatility, sampling and testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Specification. M–22; 1926. Asphalt Cement (prepared from native asphalt). For penetration grades 30 to 40, 40 to 50, 50 to 60, 60 to 70. Requirements on freedom from water, penetration, total bitumen, soluble bitumen, ductility, flash point, volatility, sampling and testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Specification. M–23; 1926. Asphalt Cement (prepared from native asphalt). For penetration grades 85 to 100, 100 to 120, 120 to 150. Requirements on freedom from water, penetration, total bitumen, soluble bitumen, ductility, flash point, volatility, sampling and testing in accordance with A. A. S. H. O. methods.

American Marine Standards Committee. E No. 14–1928. Insulation of Piping and Machinery on Ships. Includes waterproof cement with asphaltic base, type of solvent, flash point, physical characteristics after setting, flow point, spreading and mixing capabilities.

American Railway Engineering-Assn. 1929 Manual. Iron and Steel Structures. Waterproofing and Drainage of Solid Floor Railway Bridges; 1927. Includes elastic cement of asphalt, softening point, penetration, loss on heating, and ductility requirements.

American Society of Municipal Engineers. Fine Aggregate Asphaltic Concrete Paving; 1927. Includes asphalt cement, penetration, ductility, volatility, flash point, and solubility, tested in accordance with methods of A. S. T. M.

American Society of Municipal Engineers. Asphalt Macadam Pavements; 1927. Includes asphalt cement, penetration, ductility, volatility, flash point, and solubility requirements, using A. S. T. M. methods of test.

American Society of Municipal Engineers. Subgrades and Foundations for Pavements; 1928. Includes asphalt cement, specific gravity, flash point, penetration, ductility, volatility, and solubility requirements, using test methods of U. S. Dept. of Agriculture and of A. S. T. M.

American Society of Municipal Engineers. Sheet Asphalt Paving; 1927. Includes asphalt cement, requirements as to penetration, ductility, loss on heating, flash point, and proportion soluble in carbon tetrachloride.

American Society for Testing Materials. Tentative Specifications. D 99–26T; 1926. Asphalt Cement, 40 to 50 Penetration, for Use in Sheet Asphalt and Asphaltic Concrete Pavements and as Filler for Brick and Block Pavements. Requirements for penetration, flash point, loss on heating, ductility, bitumen soluble in carbon tetrachloride, in accordance with A. S. T. M. methods of test D 5, D 92, D 6, D 113, and D 165.

American Society for Testing Materials. Tentative Specifications. D 100–26T and D 101–26T; 1926. Asphalt Cement for Use in Sheet Asphalt and Asphaltic Concrete Pavements and as Filler for Block Pavements. D 100 for 50 to 60 penetration, D 101 for 60 to 70 penetration, requirements for penetration, flash point, loss on heating, ductility, and bitumen soluble in carbon tetrachloride, in accordance with A. S. T. M. test methods D 5, D 92, D 6, D 113, and D 165.

American Society for Testing Materials. Tentative Specifications. D 102–24T, D 103–24T; 1924. Also D 135–23T; 1923. Asphalt Cement for Use in Asphalt Macadam Pavements. D 102 for 85 to 100 penetration, D 103 for 100 to 120 penetration, D 135 for 120 to 150 penetration. Requirements for penetration, flash point, loss on heating, ductility, bitumen soluble in carbon tetrachloride, in accordance with A. S. T. M. test methods D 5, D 92, D 6, D 113, and D 165.

American Society for Testing Materials. Tentative Specifications. D 133–23T; 1923. Asphalt Cement, 10 to 15 Penetration, for the Manufacture of Asphalt Block. Requirements for penetration, flash point, loss on heating, ductility, and bitumen soluble in carbon tetrachloride, in accordance with A. S. T. M. test methods D 5, D 92, D 6, D 113, and D 165.

American Society for Testing Materials. Tentative Specifications. D 134–23T; 1923. Asphalt Cement, 15 to 25 Penetration, for the Manufacture of Asphalt Block. Requirements for penetration, flash point, loss on heating, ductility, bitumen soluble in carbon tetrachloride, in accordance with A. S. T. M. test methods D 5, D 92, D 6, D 113, and D 165.

American Society for Testing Materials. Tentative Specifications. D 163–23T; 1923. Asphalt Cement, 25 to 30 Penetration, for Use in Sheet Asphalt and Asphaltic Concrete Pavements. Requirements for penetration, flash point, loss on heating, ductility, and bitumen soluble in carbon tetrachloride, in accordance with A. S. T. M. test methods D 5, D 92, D 6, D 113, and D 165.

American Society for Testing Materials. Tentative Specifications. D 164–23T; 1923. Asphalt Cement, 25 to 30 Penetration, for Use in Sheet Asphalt and Asphaltic Concrete Pavements. Requirements for penetration, flash point, loss on heating, ductility, and bitumen soluble in carbon tetrachloride, in accordance with A. S. T. M. test methods D 5, D 92, D 6, D 113, D 165.

American Society for Testing Materials. D 223–30; 1930. Acid Resisting Asphalt Mastic. For use in waterproofing, proportion requirements for asphalt cement, mastic cake, and mineral aggregate, composition requirements of mastic cake, grading requirements of mineral aggregate, tests according to A. S. T. M. method D 147.

American Society for Testing Materials. D 249–27; 1927. Heavy Weight Slate Surfaced Asphalt Roll-Roofing and Heavy Weight Slate Surfaced Asphalt Shingles. Includes specifications for lap cement for roll roofing, composed of bituminous materials dissolved in volatile solvent, flash point requirements.

Underwriters Laboratories. Class C Asphalt Rag-Felt Sheet Roofing and Shingles; 1929. For lap cement, requirements on flash point and general quality.

U. S. Gov., Federal Specifications Board. 380; 1926. Asphaltic Plastic Cement. For use in construction of plastic flashings in conjunction with bituminous roofing, for the repair of asphalt and metal roofing, and as an expansion-joint material for concrete and masonry, composed of an asphaltic base, asbestos fiber, and a suitable solvent, suitable for application with a trowel, requirements on content of nonvolatile matter and of asbestos fiber, workability, time of setting, behavior at 60° C. and 0° C., toughness, examination of cement for separation, thickening, or livering, methods of sampling and test.

References.—Definitions, methods of sampling and of testing. *See also* 502.2. 505.0.

505.14 Oil Asphalt

American Railway Engineering Assn. 1929 Manual. Asphalt Base Dipping Oil; 1923. Recommended requirements of an oil for oiling track bolts, turnout fixtures, rail, tie plates, and spikes to prevent corrosion, includes requirements on flash point, penetration of asphalt, and viscosity of oil.

American Society of Municipal Engineers. Proposed Specifications; 1922. Broken Stone and Gravel Roads With and Without Bituminous Surface Treatment. Includes asphaltic oil for hot surface treatment, specific gravity, flash point, specific viscosity, float test, volatility, and solubility requirements.

American Society of Municipal Engineers. Proposed Specifications. 1922. Broken Stone and Gravel Roads With and Without Bituminous Surface Treatment. Includes cut-back asphalt cement for cold surface treatments, a mixture of asphalt cement and naphtha, specific gravity, volatility, penetration, specific viscosity, and solubility requirements.

Asphalt Institute. Asphaltic Road Materials No. 1 to No. 7; 1931. No. 1 intended for use as a dust layer, No. 2 a primer, No. 3 a nonhardening liquid of medium viscosity for mixed-in-place wearing courses. No. 4 for construction of mixed-in-place wearing courses subject to heavy traffic and severe climate, No. 5 for surface treatment of bituminous roads preparatory to light cover of stone chips, No. 6 a binder for cold patch mixtures and premixed aggregates which are to be laid cold, No. 7 for use in construction of roller-compacted mixed-in-place wearing courses. Requirements on specific viscosity, distillation ranges, and on residue from distillation, requirements on penetration, ductility, and solubility in carbon disulphide, flash point requirements for Nos. 6 and 7, standard methods of test of A. S. T. M. and Am. Assn. of State Highway Officials specified.

U. S. Gov., Federal Specifications Board. SS-A-706; 1931. Asphalt for Use in Road and Pavement Construction. Covers 14 grades of petroleum asphalt and of fluxed native asphalt, portion of country and type of traffic to which each grade is applicable, requirements on specific gravity, flash point, softening point, penetration, ductility, volatility, and bitumen content, using methods of test of Am. Soc. for Testing Materials.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0. Asphalt emulsion. *See* 505.19.

505.15 Asphalt and Other Bituminous Fillers

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Joint Fillers for Use in Waterproofing. For oil asphalt for horizontal joints and for oil asphalt and asbestos fiber for vertical joints, requirements on flash point, softening point, penetration, volatility, ductility, and total bitumen, percentage of asbestos in vertical joint filler.

American Assn. of State Highway Officials. Tentative Standard Specifications. M-18; 1924. Oil Asphalt Filler, Type A. Requirements on freedom from water, flash point, softening point, penetration, volatility, ductility, total bitumen, soluble bitumen, testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Pitch Filler for Wood Block Floors. Requirements on specific gravity, softening point, percentage of bitumen soluble in disulphide, and specific gravity of distillate.

American Assn. of State Highway Officials. Tentative Standard Specifications. M-19; 1927. Asphalt Filler, Type B. Requirements on freedom from water, flash point, softening point, penetration, volatility, ductility, total bitumen, soluble bitumen, testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Specification M-26; 1924. Tar for Use in the Maintenance of Cracks and for Sealing Joints in Concrete Roads. Requirements on percentage of water, float test, total bitumen, distillation test, softening point, sampling and testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Specifications M-33; 1924. Premolded Expansion Joints. Of asphaltic or tar composition, requirements on general properties, absorption, distortion, brittleness, sampling, and testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Method. T-42. Undated. Methods of Sampling and Testing Premolded Joint Fillers. Requirements on size of sample, test procedure for absorption, brittleness, and distortion under heat test.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Railway Buildings, Sec. 21. Brick Pavements and Floors. Expansion joint filler, requirements on proportions of asphalt, coal tar pitch, and Portland cement, coal tar pitch to conform to specifications of Am. Soc. for Testing Materials, D-112.

American Society of Municipal Engineers. Vitrified Brick Pavements; 1930. Asphalt Filler. Requirements on flash point, melting point, penetration, loss on evaporation, ductility, and total bitumen.

American Society of Municipal Engineers. Stone Block Pavements; 1927. Includes tar pitch filler and asphalt cement filler, requirements as to softening point, distillation, residue, specific gravity, and ductility for pitch, penetration, flash point, volatility, ductility, and solubility requirements for asphalt filler.

American Society of Municipal Engineers. Creosoted Wood Block Paving; 1921. Includes pitch filler and asphalt filler, melting point, free carbon, specific gravity requirements for pitch filler, percentage bitumen, penetration, ductility, and volatility requirements for asphalt filler.

American Society of Municipal Engineers. Portland Cement Concrete Pavements; 1926. Includes bituminous premolded joint filler, water absorption, brittleness, and distortion test requirements.

American Society for Testing Materials. Tentative Specifications. D 99-26T; 1926. Asphalt Cement, 40 to 50 Penetration, for Use in Sheet Asphalt and Asphaltic Concrete Pavements and as Filler for Brick and Block Pavements. Requirements for penetration, flash point, loss on heating, ductility, bitumen soluble in carbon tetrachloride, in accordance with A. S. T. M. test methods D 5, D 92, D 6, D 113, D 165.

American Society for Testing Materials. Tentative Specifications. D 100–26T and D 101–26T; 1926. Asphalt Cement for Use in Sheet Asphalt and Asphaltic Concrete Pavements and as Filler for Block Pavements. D 100 for 50 to 60 penetration, D 101 for 60 to 70 penetration, requirements for penetration, flash point, loss on heating, ductility, bitumen soluble in carbon tetrachloride, in accordance with A. S. T. M. test methods D 5, D 92, D 6, D 113, and D 165.

American Society for Testing Materials. D 112–30; 1930. Coal-Tar Pitch for Stone Block Filler. Requirements for allowable water, softening point, distillation test, specific gravity, ductility, total bitumen, in accordance with A. S. T. M. test methods D 95, D 61, D 20, D 113, and D 4.

American Society for Testing Materials. Tentative Specifications. D 241–26T; 1926. Asphalt Filler for Brick Pavements (Blown Type). Requirements for flash point, softening point, penetration, loss on heating, ductility, soluble bitumen in carbon tetrachloride, in accordance with A. S. T. M. test methods D 92, D 36, D 5, D 6, D 113, and D 165.

American Wood Preserver's Assn. 19b; 1923. Interior Creosoted Wood Block Flooring. Includes specifications for coal tar pitch filler, melting point test requirements.

American Wood Preserver's Assn. 16b; 1923. Creosoted Wood Block Street Paving. Includes specifications of bituminous filler; for coal tar pitch, test requirements for specific gravity, free carbon, melting point, distillation; for special pitch filler, specific gravity, distillation and melting point requirements; for asphalt filler, percentage bitumen, penetration, ductility.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R4; 1926. Asphalt. For asphalt used in joint filler, simplified practice recommended and accepted by industry establishing a limited list of standard varieties with penetration range for each variety.

U. S. Gov., Federal Specifications Board. SS–A–696; 1931. Petroleum Asphalt for Joint Filler. For filling joints in brick and concrete pavements, requirements on freedom from water, flash point, penetration, ductility, volatility, and bitumen content, using methods of test of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board. 380; 1926. Asphaltic Plastic Cement. For use as an expansion joint filler, composed of asphalt and asbestos fiber, requirements on content of nonvolatile matter and of asbestos fiber, workability, time of setting, behavior at 60° and 0° C., toughness, methods of sampling and test.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0, 505.30. Nonbituminous fillers. *See* 512.16.

505.16 Asphalt and Asphalt Felt for Roofing and Waterproofing

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Waterproofing Asphalt. Requirements on flash point, softening point, penetration, volatility, ductility, and total bitumen.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Built-Up Roofing; 1926. Includes asphalt roofing, melting point, penetration, ductility, volatility of asphalt, weight of asphalt primer, weight and bending test requirements for roofing felt, construction of roofs of asphalt and gravel or slag and of asphalt impregnated asbestos felt as applied over wood, concrete or gypsum.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Waterproofing and Drainage of Solid Floor Railway Bridges; 1927. Includes asphalt for mopping and saturant, asphalt for mastic, and asphalt for elastic cement, requirements on softening point, penetration, flash point, loss on heating, ductility, and solubility.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Waterproofing and Drainage of Solid Floor Railway Bridges; 1927. Rag felt or asbestos felt, saturated with asphalt or coal-tar pitch, composition of felt, dimension and weight limits for treated felts, strength, pliability, weight of saturant, moisture content, conforms closely to A. S. T. M. serial D 173–23T.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Waterproofing and Drainage of Solid Floor Railway Bridges; 1927. Includes cotton fabric treated with asphalt of coal-tar pitch, weight, ash, and thread count of fabric, width, weight, moisture content, strength, pliability, loss on heating, weight of saturant for saturated fabric. Conforms closely to A. S. T. M. D 173–25.

American Society for Testing Materials. D 40–25; 1925. Asphalt for Use in Damp Proofing Below Ground Level. Requirements on softening point, penetration, flash point, loss on heating, ductility, insolubility in carbon disulphide according to A. S. T. M. methods of sampling and testing as enumerated. For use as a mopping coat or as a plying cement in membrane system.

American Society for Testing Materials. D 41–26; 1926. Primer for Use with Asphalt in Damp-Proofing and Waterproofing Below and Above Ground level. Method of sampling, distillation points of solvent, allowable sediment, and percentage of asphaltic requirements using A. S. T. M. standard and tentative methods of test. For application to concrete and masonry surfaces.

American Society for Testing Materials. D 144–25; 1925. Asphalt for Use in Damp Proofing and Waterproofing Above Ground Level. For temperatures less than 115° F., requirements on softening point, penetration, flash point, loss on heating, ductility, insolubility in carbon disulphide, using A. S. T. M. standard methods of sampling and test. For use as a mopping coat or plying cement in membrane system.

American Society for Testing Materials. D 169–25; 1925. Asphalt Mastic for Use in Waterproofing. Proportions of mastic cake, asphalt cement and mineral aggregate, required percentages of asphalt cement and granular mineral matter in mastic cake, size grading of granular mineral matter, grading of crushed stone or gravel aggregate, asphalt cement according to A. S. T. M. specification D 163–23T.

American Society for Testing Materials. D 170–25; 1925. Bituminous Grout for Use in Waterproofing Above Ground Level. Suitable as a protective coating of membrane systems or for bedding brick or flooding surface of brick protective coating, for railroad bridges, culverts, subways. Proportions of bituminous binder and of mineral aggregate, either asphalt binder according to A. S. T. M. D 144 or coal-tar pitch binder according to A. S. T. M. specification D 42 or D 200, grade size of sand aggregate.

American Society for Testing Materials. D 171–25; 1925. Bituminous Grout for Use in Waterproofing Below Ground Level. For use as a protective covering of membrane systems, or for bedding brick, or flooding surface of brick coverings, suitable for tunnels and subways, mixture proportions, asphalt binder according to A. S. T. M. specifications D 40, or coal tar pitch binder according to A. S. T. M. D 42 or D 200, grade size of sand aggregate.

American Society for Testing Materials. D 173–27; 1927. Woven Cotton Fabrics Saturated with Bituminous Substances for Use in Waterproofing. Requirements on width and weight of saturated and desaturated fabric, moisture content, average strength, pliability, loss on heating, weight of saturant, for cotton fabric, percentage ash and thread count, using A. S. T. M. test methods D 146.

American Society for Testing Materials. D 174–25; 1925. Burlap Saturated With Bituminous Substances for Use in Waterproofing. Jute fabric saturated with either asphalt or coal-tar pitch, requirements on width, weight, strength, pliability, loss on heating, weight of saturant, also weight, ash, and composition of desaturated fabric, using A. S. T. M. standard test methods D 146.

American Society for Testing Materials. D 223–30; 1930. Acid Resisting Asphalt Mastic. For use in waterproofing, proportion requirements for asphalt cement, mastic cake, and mineral aggregate, composition requirements of mastic cake, grading requirements of mineral aggregate, tests according to A. S. T. M. method D 147.

American Society for Testing Materials. D 224–27; 1927. Asphalt Roll-Roofing Surfaced with Powdered Talc. For medium and heavy weight roofing felt saturated and coated on both sides with asphalt, general quality of felt, test requirements for degree of saturation, requirements on width, weight, pliability, loss on heating, percentage of saturant, weight and ash of desaturated felt, weight of mineral surfacings, sampling and test according to A. S. T. M. methods D 228.

American Society for Testing Materials. D 225–29; 1929. Asphalt Roll Roofing and Asphalt Shingles Surfaced with Mineral Granules. Composed of roofing felt saturated and coated with asphalt, granulated slate or mineral matter on weather side, general quality of felt, requirements for saturation, dimensions, weight, pliability, percentage saturant, ash, volatility, size and coating of nails, flash point of lap cement, tests according to A. S. T. M. method D 228.

American Society for Testing Materials. D 248–27; 1927. Asphalt Roll-Roofing Surfaced with Granular Talc. Roofing felt saturated and coated on both sides with asphalt, granular talc on face and powdered talc on back, general quality of felt and test requirements for degree of saturation, requirements on width of roll, weight, pliability, volatility, percentage saturant, ash, weight of mineral surfacings, using A. S. T. M. methods of test D 228.

American Society for Testing Materials. D 249–27; 1927. Heavy Weight Slate Surfaced Asphalt Roll-Roofing and Heavy Weight Slate Surfaced Asphalt Shingles. Roofing felt saturated and covered on both sides with asphalt, surfaced on weather side with granulated slate, general quality of felt and test for degree of saturation, width of roll, weight, pliability, volatility, percentage saturant, ash, weight of mineral surfacing, size and type of nails, flash point requirements for lap-cement, tests according to A. S. T. M. method D 228.

American Society for Testing Materials. D 226–27; 1927. Asphalt-Saturated Roofing Felt for Use in Waterproofing and in Constructing Built-Up Roofs. General quality of felt, test requirements for degree of saturation, requirements for width, weight of saturated felt, loss on heating, pliability, percentage of saturant, weight and ash of desaturated felt, using A. S. T. M. test methods D 146.

American Society for Testing Materials. Tentative Specification. D 228–31T; 1931. Methods of Testing Asphalt Roll-Roofing Surfaced with Fine or Granular Talc, Slate Surfaced Asphalt Roll-Roofing and Slate Surfaced Asphalt Shingles. Method of sampling, determination of size and weight, pliability of roofing, loss on heating, percentage of saturant, weight of felt, ash, and mineral surfacing.

American Society for Testing Materials. D 250–27; 1927. Asphalt Saturated Asbestos Felt for Use in Constructing Built-Up Roofs. General quality of asbestos felt, test requirements for degree of saturation, requirements on width, weight, loss on heating, pliability, percentage of saturant, weight and ash of desaturated felt, using A. S. T. M. test methods.

American Society for Testing Materials. Tentative Specifications. D 312–29T; 1929. Asphalt for Use in Constructing Built-Up Roof Coverings. Covers asphalt for use as hot cement and mopping coat, including steam distilled and blown-petroleum asphalts and mixtures with native asphalts, requirements for softening point, penetration, loss on heating, ductility, solubility, ash, elutriation test, in accordance with A. S. T. M. methods of test D 36, D 5, D 6, D 113, D 4, D 271, D 165, and D 313.

Asphalt Shingle and Roofing Institute. Directions for Laying Roll Roofings; 1920. Includes a series of specific and essential features to be included in the manufacturers' roll roofing directions and recommendations and precautions that are desirable but not essential.

Asphalt Shingle and Roofing Institute. Directions for Laying Shingles; 1921. Rules of fundamental importance that should not be omitted from manufacturer's direction sheet.

Underwriters Laboratories. Class C Asphalt Rag-Felt Sheet Roofing and Shingles; 1929. Requirements on general quality and weight of felt, before and after saturation, on character and flashpoint of saturant and coating, test requirements for pliability, adhesion of surfacing, behavior on heating, and stickiness, for single thickness felt, saturated and coated on both sides 2 weight classes, flash point of lap cement, size and coating of nails.

U. S. Gov., Federal Specifications Board. 84; 1924. Asphalt for Mineral Surfaced Roofing. Intended for use with asphalt saturated rag felt for roofing and waterproofing (F. S. B. spec. 86) in construction of built-up roofing, requirements on appearance, melting point, penetration, ductility, volatile matter, solubility in carbon disulphide, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 86; 1924. Asphalt Saturated Rag Felt for Roofing and Waterproofing. For use with asphalt for roofing covered in F. S. B. specifications 84, 85, and 88, requirements on appearance, width, weight, pliability, breaking strength, weight of saturant, weight of surfacing, and ash, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 295; 1925. Asphalt Saturated Rag Felt for Flashings. Requirements on general quality and appearance, width, weight, pliability, strength, percentage of volatile matter, weight of saturant, ash, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 82; 1924. Surfacing Materials for Bituminous Built-Up Roofing. Requirements on general quality and screen grading of roofing gravel, roofing slag, and crushed stone, general quality and tolerance on specified dimensions of promenade tile, general quality and minimum thickness of slate, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 85; 1924. Asphalt for Waterproofing and Damp Proofing. For use with asphalt saturated rag felt for roofing and waterproofing (F. S. B. Spec. 86) as a plying cement in construction of membrane waterproofing or alone as damp proofing, requirements on appearance, melting point, penetration, ductility, volatile matter content, solubility in carbon disulphide, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 87; 1924. Asphalt Primer for Roofing and Waterproofing. Intended for use as a priming coat on concrete, gypsum, and masonry surfaces over which asphalt roofing or waterproofing is to be applied, requirements on content of asphaltic base, distillation range for solvent, melting point and penetration of asphaltic base, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 88; 1924. Asphalt for Unsurfaced Built-Up Roofing. For use with asphalt saturated rag felt for roofing (F. S. B. Spec. 86) or with asphalt saturated asbestos felt in the construction of unsurfaced built-up roofing, requirements on appearance, melting point, penetration, ductility, content of volatile matter, solubility in carbon disulphide, and ash, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 146 and 147; 1924. Construction of Built-Up Roofing, Types 4AWS and 5AWS. For roofing built up on board sheathing or gypsum slabs, spec. 146 covering 4 layer roof and spec. 147 covering 5 layer roof, made of asphalt saturated rag felt cemented together with asphalt, requirements on weights per unit area of saturated felt, of asphalt surfacing, of roofing gravel or slag, methods of application, materials according to F. S. B. specifications.

U. S. Gov., Federal Specifications Board, 148, 149, and 150; 1924. Construction of Built-Up Roofing, Types 3ACS, 4ACS, and 5ACS. For roofing adapted to concrete and poured gypsum surfaces, Spec. 148 for 3 layer, Spec. 149 for 4 layer, and Spec. 150 for 5 layer roofs, made of asphalt saturated rag felt cemented together with asphalt, requirements on weights per unit area of asphalt primer, of saturated felt, of asphalt surfacing, of roofing gravel or slag, methods of application, materials according to F. S. B. specifications.

U. S. Gov., Federal Specifications Board. 214; 1924. Asphalt Prepared Roofing. For 2 weights of roofing of rag felt saturated and coated with asphaltic compounds, requirements on appearance, width of roll, weight per unit area, pliability, effect of heat, thickness and weight and ash of desaturated felt, per cent saturation, weight of talc or mica surfacing, methods of test.

U. S. Gov., Federal Specifications Board. 423; 1926. Slate Surfaced Asphalt and Asbestos Prepared Roofing. Requirements on percentage of asbestos fiber in felt, saturation and coating with asphalt, surfacing with granulated slate, on width, area, and weight of rolls, allowable volatile matter, behavior on heating, weight and thickness of felt, weight of slate, dimensions of nails, methods of test, weight of saturant.

U. S. Gov., Federal Specifications Board. 296; 1925. Slate Surfaced Asphalt Prepared Roofing and Shingles. For roll roofing and shingles of rag felt saturated on 2 sides with asphalt and surfaced on one side with granulated slate, requirements on behavior when heated, percentages of volatile matter and ash, weight, thickness, weight of slate, width of roll, percentage saturation, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 294; 1925. Asphalt Saturated Woven Cotton Fabric for Waterproofing. Requirements on general quality, porosity, width, weight, weight of surfacing, percentage of volatile matter and of ash, pliability, weight of saturant, thread count, for all-cotton fiber fabric, methods of test.

U. S. Gov., Federal Specifications Board. 380; 1926. Asphaltic Plastic Cement. For use in construction of plastic flashings, repair of asphalt and metal roofs, composed of asphalt and asbestos fiber, requirements on content of nonvolatile matter and of asbestos fiber, workability, time of setting, behavior at 60° and 0° C., toughness, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 424; 1926. Asphalt Fibrous Roof Coating. Requirements on consistency of asphaltic materials, percentage of nonvolatile matter, percentage of asbestos fiber in roof coating, time of setting, behavior on heating, and toughness, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 444a; 1928. Integral Waterproofing Material. For material intended for mixing with Portland cement mortar or concrete for waterproofing, requirements on general qualities of material, permissible reduction in compressive strength of the waterproofed mortar or concrete, permissible absorption and required reduction in permeability to water, test methods.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0. Granular slate for roofings. *See* 511.52. Roofing felts. *See also* 365.98, 473.2. Roofing nails. *See also* 608.11. Tar roofing and waterproofing. *See* 505.36. Roof construction. *See also* 518.57. Cotton fabric for waterproofing. *See also* 392.4.

505.17 Asphaltic Mastic Flooring

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Waterproofing and Drainage of Solid Floor Railway Bridges; 1927. Includes asphalt mastic, flash point, penetration, ductility, solubility of asphalt, grade and quality of coarse and fine aggregate and mineral filler, percentage of asphalt in mastic cake, and mixture proportions for poured-in-place mastic.

Assn. of Railway Electrical Engineers. 1929 Manual. C–III; 1928. Recommended Storage Battery Installation and Maintenance Practice. Includes recommended specifications for acid proof mastic battery room floor for battery room not directly on ground, requirements for construction of floor using asphalt saturated felt on concrete floor and covered with mastic, for single membrane and double membrane types, tests for acid resistance and hardness.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0. Asphalt for bituminous carpets. *See* 505.19.

505.19 Miscellaneous Specifications for Asphalt

American Assn. of State Highway Officials Tentative Standard Specifications. M–38; 1930. Asphalt Emulsion, Slow Breaking Type. Requirements on general quality, stability, distillation test, and for residue from distillation test requirements on specific gravity, softening point, penetration, bitumen, and ash, using A. A. S. H. O. methods of test.

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Asphalt for Bituminous Carpets. For concrete or wood bridge floors, requirements on specific gravity, flash point, volatility, penetration, ductility, bitumen soluble in carbon disulphide and in carbon tetrachloride, covers both oil asphalt and native asphalt.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Waterproofing and Drainage of Solid Floor Railway Bridges; 1927. Includes asphaltic primer, distillation points for hydrocarbon solvent, percentage of sediment and asphaltic base in primer.

American Society of Municipal Engineers. Portland Cement Concrete Pavements; 1926. Includes asphalt for grout or mastic, penetration, flash point, volatility, ductility, and solubility requirements for asphalt, composition and preparation of the grout and mastic.

U. S. Gov., Federal Specifications Board. SS–A–681; 1930. Emulsion Asphalt, Slow Breaking Type. For use in repair and resurfacing of bituminous roads, requirements on distillation test, on specific gravity, softening point, penetration, bitumen content, and ash for the residue from distillation test, using test methods of Am. Soc. For Testing Materials.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Shipping Container Spec. 10A. Wooden Barrels and Kegs (Tight). For asphaltum used for lining, requirements on specific gravity, melting point, flash point, fire test, penetration, and matter insoluble in carbon disulphide, mandatory for use in shipment of dangerous articles.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0.

505.2 ROAD OILS

505.20 General Items

American Assn. of State Highway Officials. Tentative Method T–54. Undated. Method of Test for Specific Viscosity. For fluid bituminous road materials, test procedure using Engler viscosimeter.

American Society for Testing Materials. D 95–30; 1930. Approved by American Standards Assn. as Z11i–1930. Method of Test for Water in Petroleum Products and Other Bituminous Materials. Especially applicable to petroleum, fuel oil, road oil, coal tar, water-gas tar, coke oven tar, etc. Determination of water by distilling sample with volatile solvent, dimensions and design of still, distillation requirements for solvents, test procedure.

505.21 Oil for Cold Application to Roads

American Society of Municipal Engineers. Proposed Specifications; 1922. Broken Stone and Gravel Roads With and Without Bituminous Surface Treatment. Includes temporary substitute for road oil for cold application, specific gravity, flash point, specific viscosity, volatility, float test, and solubility requirements.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0, 505.20. Asphaltic road oils. *See* 505.14. Road tars. *See* 505.31–505.35.

505.22 Oil for Hot Application to Roads

U. S. Gov., Federal Specifications Board. VV–O–751; 1931. Road Oil for Hot Application. For hot surface treatment of macadam, gravel, or shell roads, prepared from asphaltic petroleum, requirements on freedom from water, nonfoaming qualities, specific gravity, flash point, viscosity, float test, volatility, and bitumen content, using test methods of A. S. T. M.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0. 505.20. Asphaltic road oils. *See* 505.14. Road tars. *See* 505.31–505.35.

505.23 Oil Asphalt

References.—Oil asphalt. *See* 505.14.

505.29 Miscellaneous Specifications for Road Oils

American Society for Testing Materials. Tentative Specifications. D 98–30T; 1930. Calcium Chloride for Dust Prevention. For use on highways, screen analysis and chemical composition requirements.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0, 505.20.

505.3 TAR AND TAR PITCH

References.—Coal-tar chemical products. *See* 800–809.

505.30 General Items

American Assn. of State Highway Officials. Tentative Method. T–52. Undated. Method of Test for Distillation of Tars and Tar Products. Same as D 20–30 of Am. Soc. for Testing Materials. *See* 505.0.

American Society for Testing Materials. D 61–24; 1924. Method of Test for Softening Point of Tar Products. Cube in water method, dimensions, design, and material of sample, hook, container, and thermometer, assembly of apparatus and test procedure for ordinary pitches and for soft pitches.

American Society for Testing Materials. D 95–30; 1930. Approved by American Standards Assn. as Z11i–1930. Method of Test for Water in Petroleum Products and Other Bituminous Materials. Especially applicable to petroleum, fuel oil, road oil, coal tar, water-gas tar, coke oven tar, etc. Determination of water by distilling sample with volatile solvent, dimensions and design of still, distillation requirements of solvent, test procedure.

American Society for Testing Materials. D 165–27; 1927. Method of Test for Determination of Proportion of Bitumen Soluble in Carbon Tetrachloride. List of apparatus, preparation of sample, preparation of Gooch crucible, test procedure.

American Society for Testing Materials. Tentative Definitions. D 324–30T; 1930. Definitions of Terms Relating to Timber Preservatives. Definitions of creosote, creosote coal-tar solution, creosote distillate, coal-tar, coal gas tar, coke oven tar, and water gas tar.

American Wood Preservers' Assn. 3b; 1931. Definition of Tar. Defines three classes of tars in general terms.

505.31 Tars for Cold Application to Roads

American Assn. of State Highway Officials. Tentative Specifications. M–24; 1924. Tar for Surface Treatment. For cold application, requirements on percentage water, viscosity, bitumen, distillation, softening, sampling and testing in accordance with A. A. S. H. O. methods.

American Society of Municipal Engineers. Proposed Specifications; 1922. Broken Stone and Gravel Roads With and Without Bituminous Surface Treatment. Includes high carbon tar and low carbon tar for cold surface treatment, moisture, specific gravity, specific viscosity, distillation test, softening point, and free carbon requirements, using A. S. T. M. methods of test.

American Society for Testing Materials. D 104–30; 1930. High Carbon Tar for Surface Treatment, Cold Application. Requirements on percentage of water, specific viscosity, distillation test, specific gravity, softening point, total bitumen, in accordance with A. S. T. M. test methods D 95, D 20, D 36, D 4, viscosity test according to U. S. Dept. of Agriculture Bulletin 1216.

American Society for Testing Materials. D 105–30; 1930. Low Carbon Tar for Surface Treatment, Cold Application. Requirements for allowable water, viscosity, distillation test, softening point, total bitumen, in accordance with test methods D 95 of A. S. T. M., Bulletin No. 1216 of U. S. Dept. of Agriculture, D 20, D 36, and D 4 of A. S. T. M.

U. S. Gov., Federal Specifications Board. R–T–101; 1931. Tars for Cold Application. For 4 grades dependent on viscosity, requirements on specific gravity, viscosity, distillation test, softening point, bitumen content, and water content, using methods of test of A. S. T. M.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0, 505.30. Tar for repair work, cold application. *See also* 505.34.

505.32 Tars for Hot Application to Roads

American Assn. of State Highway Officials. Tentative Specifications. M–25; 1924. Tar for Surface Treatment. For hot application. Requirements on percentage water, float test, total bitumen, distillation test, softening point, sampling and testing in accordance with A. A. S. H. O. methods.

American Society of Municipal Engineers. Proposed Specifications; 1922. Broken Stone and Gravel Roads With and Without Bituminous Surface Treatment. Includes refined tars for hot surface treatments, low carbon and high carbon types, moisture, specific gravity, float test, distillation test, softening point, and free carbon requirements, using A. S. T. M. methods of test.

American Society for Testing Materials. D 108–30; 1930. High Carbon Tar for Surface Treatment, Hot Application. Requirements for allowable water, float test, distillation test, specific gravity, softening point, total bitumen, in accordance with A. S. T. M. test methods D 95, D 139, D 20, D 36, and D 4.

American Society for Testing Materials. D 109–30; 1930. Low Carbon Tar for Surface Treatment, Hot Application. Requirements on permissible water, float test, distillation test, softening point, total bitumen, in accordance with A. S. T. M. test methods D 95, D 139, D 20, D 36, and D 4.

U. S. Gov., Federal Specifications Board. R–T–131; 1931. Refined Tar for Hot Application. For hot surface treatment of macadam and gravel roads, requirements on specific gravity, float test, distillation test, bitumen content, using methods of test of Am. Soc. for Testing Materials.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0, 505.30. Bituminous fillers. *See also* 505.15. Tar for repair work, hot application. *See also* 505.34.

505.33 Tars for Road Construction

American Wood Preserver's Assn. 15a; 1923. Preservatives for Flooring and Paving Blocks. Includes refined water-gas tar, requirements on allowable water, insoluble matter, specific gravity, distillation, using A. W. P. A. standard method for Creosote Analysis.

U. S. Gov., Federal Specifications Board. R-T-121; 1931. Refined Tar for Construction. For 6 grades of water gas and coal tar, for use in construction of bituminous macadam roads, requirements on freedom from water, specific gravity, float test, distillation test, bitumen content, using methods of test of A. S. T. M.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0, 505.30. Pitch and other bituminous fillers. *See also* 505.15. Tar for cold application. *See also* 505.31. Tar for hot application. *See also* 505.32. Tar for repair work. *See also* 505.34. Tar cement. *See also* 505.35.

505.34 Tars for Repair Work

American Society for Testing Materials. Tentative Specifications. D 106–28T; 1928. High Carbon Tar Cement for Use Cold in Repair Work (Cut-Back Product). Requirements for allowable water, viscosity, distillation test, softening point, total bitumen, in accordance with test methods D 95 of A. S. T. M., Bulletin 691 of U. S. Dept. of Agriculture, D 20, D 36, D 4 of A. S. T. M.

American Society for Testing Materials. Tentative Specifications. D 107–28T; 1928. Low Carbon Tar Cement for Use Cold in Repair Work (Cut-Back Product). Requirements for allowable water, viscosity, distillation test, softening point, total bitumen, in accordance with test methods D 95 of A. S. T. M., Bulletin 691 of U. S. Dept. of Agriculture, D 20, D 36, and D 4 of A. S. T. M.

U. S. Gov., Federal Specifications Board. R–T–141; 1931. Tar for Use in Repair Work. For use in repair of roads by surface application or by mixing with broken stone, graded according to viscosity into 2 grades, requirements on specific gravity, viscosity, distillation test, bitumen content, water content, using test methods of Am. Soc. for Testing Materials.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0, 505.30. Tar cement. *See also* 505 35.

505.35 Tar Cement

American Assn. of State Highway Officials. Tentative Specification. M–27; 1924. Tar Cement. For construction of bituminous macadam by penetration method, requirements on freedom from water, float test, total bitumen, distillation test, softening point, sampling and tests in accordance with A. A. S. H. O. methods.

American Society of Municipal Engineers. Asphaltic Concrete; 1916. Includes coal-tar cement and water-gas tar cement, specific gravity, melting point, free carbon, moisture, and ash requirements for coal tar cement; specific gravity, solubility, penetration, and distillation test requirements for water-gas tar cement.

American Society for Testing Materials. Tentative Specifications. D 106–28T; 1928. High-Carbon Tar Cement for Use Cold in Repair Work. D 107–28T. 1928. Low-Carbon Tar Cement for Use Cold in Repair Work. (Cut-Back Products). Requirements on allowable water, viscosity, distillation test, softening point, total bitumen, with test methods in accordance with standard methods of A. S. T. M. and U. S. Dept. of Agriculture.

American Society for Testing Materials. D 110–30; 1930. High-Carbon Tar Cement. For use in construction of tar macadam and tar concrete pavements, requirements for permissible water, softening point, distillation test, specific gravity, total bitumen, in accordance with A. S. T. M. test methods D 95, D 36, D 20, D 139, D 4.

American Society for Testing Materials. D 111–30; 1930. Low-Carbon Tar Cement. For use in construction of tar macadam and tar concrete pavements, requirements for permissible water, softening point, distillation test, total bitumen, in accordance with A. S. T. M. test methods D 95, D 36, D 20, D 139, and D 4.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0, 505.30. Tar cement for repair work. *See also* 505.34.

505.36 Tar and Tar Felt for Roofing and Waterproofing

American Marine Standards Committee. O No. 15–1928. Marine Glue for Seams of Ship Decks.

Definitions, grade and composition, test requirements as to specific gravity, melting point, penetration, evaporation, with appendix on use and conditions of application. Grade A of bitumens and vegetable pitches, Grade B of bitumens, vegetable pitch, coal tar.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Built-Up Roofing; 1926. Percentage of carbon, melting point of coal-tar pitch, melting point, penetration, ductility, volatility of asphalt, weight of asphalt primer, weight and bend test requirements for roofing felt, construction of roofs of pitch and gravel over wood, or concrete, or gypsum, of roofs of asphalt and gravel or slag over wood, gypsum, or concrete, of roofs of impregnated asbestos felt and asphalt cement over wood, or concrete, or gypsum.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Waterproofing and Drainage of Solid Floor Railway Bridges; 1927. Includes coal-tar pitch, specific gravity, distillation test, softening point, ductility, and solubility requirements.

American Society for Testing Materials. D 43–25; 1925. Creosote Oil for Priming Coat with Coal-Tar Pitch in Damp Proofing and Waterproofing Below and Above Ground Level. For application to concrete or masonry surfaces, method of sampling, requirements on dryness, consistency, specific gravity, insolubility in benzol, and distillation test, using A. S. T. M. test methods for creosote oil, D 38.

American Society for Testing Materials. D 42–25; 1925. High-Carbon Coal-Tar Pitch for Use in Damp Proofing and Waterproofing below ground level. Requirements on dryness, specific gravity, softening point, distillation test, ductility, and insolubility in carbon disulphide, using A. S. T. M. standard methods of sampling and test. For use as a mopping coat or plying cement in membrane system of waterproofing.

American Society for Testing Materials. D 145–25; 1925. High-Carbon Coal-Tar Pitch for Use in Damp Proofing and Waterproofing above Ground Level. Requirements on dryness, specific gravity, softening point, distillation test, ductility, and insolubility in carbon disulphide, using A. S. T. M. standard methods of sampling and test. For use as a mopping coat or plying cement in membrane type proofing.

American Society for Testing Materials. D 200–25. 1925. High Bitumen Coal-Tar Pitch for Use in Damp Proofing and Waterproofing Below Ground Level. Requirements on dryness, specific gravity, softening point, distillation test, ductility, solubility in carbon disulphide, using A. S. T. M. standard methods of sampling and test. For use as a mopping coat or plying cement in membrane system of waterproofing.

American Society for Testing Materials. D 201–25; 1925. High Bitumen Coal-Tar Pitch for Use in Damp Proofing and Waterproofing above Ground Level. Requirements on dryness, specific gravity, softening point, distillation test, ductility, and solubility in carbon disulphide, using A. S. T. M. standard methods of sampling and test. For use as a mopping coat or plying cement in membrane system of waterproofing.

American Society for Testing Materials. D 251–27; 1927. High-Carbon Coal-Tar Pitch for Use in Constructing Built-Up Roofs Surfaced with Slag or Gravel. For use as mopping coat on inclines up to 3-inches per foot over boards and 1-inch per foot over concrete, requirements for dryness, specific gravity, softening point, distillation, ductility, insolubility, ash, using A. S. T. M. standard methods.

American Society for Testing Materials. D 252–27; 1927. High-Bitumen Coal-Tar Pitch for Use in Constructing Built-Up Roofs Surfaced with Slag or Gravel. For use as a mopping coat for maximum inclines of 3-inches per foot over boards and 1-inch per foot over concrete, requirements on dryness, specific gravity, softening point, distillation test, ductility, total bitumen, ash, using A. S. T. M. standard methods.

American Society for Testing Materials. D 227–27; 1927. Coal-Tar Saturated Roofing Felt for Use in Waterproofing and in Constructing Built-Up Roofs. General quality of felt, test requirements for degree of saturation, requirements for width, weight, moisture, distillate percentage, pliability, percentage of saturant, weight and ash of desaturated felt, using A. S. T. M. standard test methods D 146.

United Roofing Contractors Assn. Gravel or Slag Roofing Specification; 1915. One construction specification for use over concrete and one for use over board sheathing, requirements on procedure in laying felt, amount of lap, mopping and nailing procedure, minimum weights of felt and of gravel, required use of U. R. C. A. inspected materials, inspection requirements of materials not stated. Covers pitch roofs only.

U. S. Gov., Federal Specifications Board. 80; 1924. Coal-Tar Pitch for Roofing. For use with F. S. B. spec. 81 (coal-tar saturated rag felt for roofing) in construction of built up roofing over board sheathing, requirements on appearance, melting point, ductility, specific gravity, free carbon content, distillation test, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 81; 1924. Coal-Tar Saturated Rag Felt for Roofing and Waterproofing. For use with coal-tar pitch specified in F. S. B. specifications Nos. 80 and 83, requirement on appearance, width, weight of roll, weight per unit area, pliability, breaking strength, thickness and ash of desaturated felt, sampling and methods of test.

U. S. Gov., Federal Specifications Board. 82; 1924. Surfacing Materials for Bituminous Built-Up Roofing. Requirements on general quality and screen grading of roofing gravel, roofing slag, and crushed stone, general quality and tolerance on specified dimensions of promenade tile, general quality and minimum thickness of slate, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 83; 1924. Coal-Tar Pitch for Waterproofing and Damp Proofing. For use with tar saturated rag felt (F. S. B. Spec. 81 for roofing felt) in construction of membrane waterproofing or used alone for damp proofing and waterproofing tanks, walls, etc., requirements on appearance, melting point, ductility, specific gravity, free carbon, and distillation test, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 151, 152, and 153; 1924. Construction of Built-Up Roofing, Types 3TCS, 4TCS, and 5TCS. For tar roofing adapted to concrete and poured gypsum surfaces, Spec. 151 for 3 layer, Spec. 152 for 4 layer, and Spec. 153 for 5 layer roofing, made of coal-tar saturated rag felt cemented with coal-tar pitch, requirements on weights per unit area of saturated rag felt, of coal-tar pitch, and of roofing gravel or slag, methods of application, materials according to F. S. B. specifications.

U. S. Gov., Federal Specifications Board. 154 and 155; 1924. Construction of Built-Up Roofing, Types 4TWS and 5TWS. For tar roofing adapted to board sheathing or gypsum slabs or blocks, Spec. 154 for 4 layer and Spec. 155 for 5 layer roofs, made of coal-tar saturated rag felt cemented with coal-tar pitch, requirements on weight per unit area of sheathing paper, of saturated felt, of coal-tar pitch, and of roofing slag or gravel, methods of application, materials according to F. S. B. specifications.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0, 505.30. Asphalt roofing and waterproofing. *See* 505.16. Roofing felts, *See also* 365.98, 473.2. Roof construction. *See also* 518.57. Cotton fabric for waterproofing. *See also* 392.4.

505.37 Tar Oils

American Electric Railway Engr. Assn. Recommended Specification. WP112–26; 1926. Specification for Water-Gas-Tar Distilate. Allowable percentage of water and of matter insoluble in benzol, specific gravity of oil and of the fractions. percentages distilling at given temperatures and coke residue.

American Electric Railway Engr. Assn. Recommended Specification. WP113–26; 1926. Specification for Water-Gas-Tar Mixture. Made up of 60 per cent distillate, allowable percentage of water and of matter insoluble in benzol, specific gravity of the oil and of the fractions, percentage distilling at given temperatures, and coke residue.

American Wood Preserver's Assn. 15a; 1923, Preservatives for Flooring and Paving Blocks Includes coal-tar paving oil and coal-tar distillate oil, requirements on allowable water, insoluble matter, specific gravity, distillation, float test, and coke residue, tests in accordance with A. W. P. A. standard method of analysis of creosote.

References.—Definitions, methods of sampling and of testing: *See also* 502.2, 505.0, 505.30. Creosote and naphthalene. *See* 801.3, 801.4.

505.39 Miscellaneous Specifications for Tar

American Society for Testing Materials. Tentative Specifications. D 112–30; 1930. Coal-Tar Pitch for Stone Block Filler. Requirements for allowable water, softening point, distillation test, specific gravity, ductility, total bitumen, in accordance with A. S. T. M. test methods D 95, D 61, D 20, D 113, and D 4.

American Wood Preserver's Assn. 19b; 1923. Interior Creosoted Wood Block Flooring. Includes specifications for coal tar pitch filler, melting point test requirements.

American Wood Preserver's Assn. 16b; 1923. Creosoted Wood Block Street Paving. Includes specifications for bituminous filler. For coal-tar pitch, test requirements for specific gravity, free carbon, melting point, and distillation; for special pitch filler, specific gravity, distillation and melting point requirements.

References.—Definitions, methods of sampling and of testing. *See also* 502.2, 505.0. 505.30.

505.4 BITUMINOUS SURFACE TREATMENTS

References.—Bituminous macadam and bituminous concrete pavements. *See* 518.34. Asphalt pavements. *See* 518.37.

506. OZOKERITE AND OTHER MINERAL WAXES

References.—Paraffin wax. *See* 504.54.

509. MISCELLANEOUS OILS

References.—Petroleum distillate thinner for paint. *See* 848.7.

510–519 STONE, SAND, AND CEMENTITIOUS MATERIAL

510. GENERAL ITEMS

American Concrete Institute. Definitions. Definitions of materials, forms, and apparatus used in concrete constructions. Proceedings of the A. C. I., vol. 19 of 1923, p. 320.

American Society of Mechanical Engineers. Power Test Codes. Instruments and Apparatus, pt. 16; 1931. Density Determination. Includes methods of density determination for solids including measuring and weighing method, pycnometer method, and hydrostatic weighing method.

American Society for Testing Materials. D 2–26; 1926. Abrasion of Rock. Similar in almost all respects to the Deval abrasion test of French School of Roads and Bridges, dimensions and design of machine, preparation of sample, test procedure, for testing broken stone for obtaining the coefficient of wear.

American Society for Testing Materials. D 3–18; 1918. Approved by American Standards Assn. as A 5–1930. Method of Test for Toughness of Rock. Definition of toughness, dimensions and weights of parts of testing machine, preparation of test specimens, method of testing.

American Society for Testing Materials. D 8–18; 1918. Definitions of Terms Relating to Materials for Roads and Pavements. Covers bituminous and nonbituminous materials.

American Society for Testing Materials. D 75–22; 1922. Approved by American Standards Assn. as A 26–1930. Standard Methods of Sampling Stone, Slag, Gravel, Sand and Stone Block for Use as Highway Materials. Methods of sampling of stone from ledges or quarries for quality, sampling of stone from commercial quarries, sampling of field stone and boulders, sampling of sand and gravel, and of stone block.

American Society for Testing Materials. E 4–27; 1927. Methods of Verification of Testing Machines. For testing machines that measure load, methods of verification by standard weights, by standardized proving levers, by means of elastic calibration device, and by comparison method, tolerances for new and for used machines.

American Society for Testing Materials. E 6–30 and E 6–30T; 1930. Definitions of Terms Relating to Methods of Testing. Definitions of stress, strain, stress-strain diagram, elastic limit, yield point, tensile strength, compressive strength, modulus of elasticity.

American Society for Testing Materials. E 12–27; 1927. Definitions of Terms Relating to Specific Gravity. Covers specific gravity and absolute specific gravity of solids and liquids, apparent specific gravity of solids, and bulk specific gravity of solids.

American Society for Testing Materials. Tentative Standard. D 326–30T; 1930. Method of Compression Testing of Natural Building Stone. Sampling and preparation of test specimen for dry condition testing and for wet condition testing, test procedure.

American Society for Testing Materials. Tentative Standard. D 327–31T; 1931. Method of Flexure Testing of Natural Building Stone. For determination of modulus of rupture, requirements on types of specimens, dimensions of knife-edges supporting specimen, sensitivity of test machine, test procedure.

American Society for Testing Materials. Tentative Standard. D 328–31T; 1931. Methods of Test for Absorption and Apparent Specific Gravity of

Natural Building Stone. Requirements on test specimen, methods of test, calculation.

Asphalt Shingle and Roofing Institute. Tests for Granular Surfacing Materials; 1922. For crushed slate or other mineral granules for surfacing composition roll roofing and shingles, sampling and design of sampler, test procedure for permanency of color, moisture, sieve analysis, and percentage of dust and powder.

Asphalt Shingle and Roofing Institute. Recommended tests. Tests for Powdered Surfacing Materials; 1923. For talc, sand, mica, and powdered surfacing materials and for powdered and dust fillers. Sampling, moisture and sieve analysis test procedure the same as for Granular Surfacing Materials tests of A. S. R. I. with modifications as noted.

511. STONE AND STONE MANUFACTURES

511.1 GRANITE

National Building Granite Quarries Assn. (Inc.). Architectural Granite. Undated. Includes specifications for granite work, general requirements on quality of granite, submitting of samples for judging quality, texture and color, requirements on degree of finish, quality of finish and cutting, construction of beds and joints, bonding, provision of washes and drips, etc.

References.—Definitions, methods of sampling and of testing. *See also* 500, 510. Granite curb. *See also* 518.63. Stone block. *See also* 511.71. Riprap. *See also* 511.72. Ashlar stone, rubble stone, riprap stone. *See* 511.9.

511.2 LIMESTONE AND DOLOMITE

American Ceramic Society. Journal of A. C. S. for June 1928. Bureau of Standards. Cir. 118. Adopted by A. C. S. in 1924. Limestone, Quicklime, and Hydrated Lime. Use of lime in manufacture of glass, definitions, requirements on chemical composition of nonvolatile portion of limestone, quicklime or hydrated lime, fineness, methods of sampling and testing.

American Society for Testing Materials. C 25–29; 1929. Methods of Chemical Analysis of Limestone, Quicklime and Hydrated Lime. Treatment of sample, determination of silica and insoluble matter, of total iron, aluminum, calcium, strontium, magnesium, volatile matter, mechanical moisture, carbon dioxide, sulphuric anhydride, sulphur, phosphorus, manganese, ferrous iron, available lime, procedure of test.

Indiana Limestone Institute. Grading and Uniform Classification of Indiana Limestone; 1928. Definitions of 11 grades, including fineness of grain, allowable variations in density, color and texture, permissible streaks, seams, pit holes, etc., hardness, density, etc., special utility of each grade, definitions of mill block, dimension stone, monolith block, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C207; 1925. Limestone, Quicklime, Lime Powder, and Hydrated Lime for Use in the Manufacture of Sugar. Approved by Interdepartmental Conference on Chemical Lime, Nat'l Lime Assn., and Hawaiian Sugar Planters Assn. For limestone, requirements on percentage of sugar soluble lime, permissible magnesia, loss on ignition, tolerance on size, methods of sampling and test.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C144; 1923. Limestone and Quicklime for Use in the Manufacture of Sulphite Pulp. Approved by Interdepartmental Conference, Nat'l Lime Assn., and Tech. Assn. of Pulp and Paper Assn. Requirements on chemical composition of high calcium limestone and of high magnesium limestone, methods of sampling and testing.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Argillaceous Limestone. Sample No. 1a prepared and sold by the Bureau with a certificate of analysis, for use in industry and by others as a comparison standard for checking the accuracy of analysis of limestone, etc. Analysis shown in supplement.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Dolomite. Sample No. 88 prepared and sold by the bureau with a certificate of its complete analysis, for use by industrial organizations as a comparison standard in checking the accuracy of analysis of similar material, etc.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510. Stone block. *See* 511.71. Riprap. *See* 511.72 Ashlar, rubble, and riprap stone. *See* 511.9.

511.3 MARBLE

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Marble and Tile Work; 1929. Includes Terrazzo Tile, dimensions, pressure used in manufacture, made from marble chips, requirements for construction of terrazzo tile floor and base.

National Assn. of Marble Dealers. Interior Marble Work; 1926. Explanatory of the material a specification for interior marble work should contain, includes grouping of marbles according to properties for finishing, kinds of finish and where used, standard thicknesses for marble for different applications, recommended details and methods of construction, 42 plates illustrating typical installations.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Water-Closet Inclosures and Partitions. For marble, slate, soapstone, or glass, dimensions of slabs and of assembled inclosures and partitions, general quality and finish requirements for slate and soapstone.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Bath Inclosures With and Without Lead Pan. For shower bath and dressing room inclosures of marble, slate, soapstone, or glass, dimensions of slabs and of assembled inclosures, details of joints, construction requirements for concrete floor foundation and for placing lead pan, general quality and finish requirements for slate and soapstone.

References.—Definitions, methods of sampling and of testing.—*See also* 500., 510. Electrical panels and switchboards. *See* 714.4. Telephone switchboards. *See* 718.22. Fuse blocks. *See* 714.22. Switches and switch bases. *See* 714.52. Cut-out bases. *See* 714.22.

511.4 SANDSTONE

References.—Definitions, methods of sampling and of testing. *See* 500., 510. Stone block. *See* 511.71. Riprap. *See* 511.72. Ashlar, riprap, and rubble stone. *See* 511.9. Sandstone curb. *See* 518.63.

511.5 SLATE

511.50 General Items

American Society for Testing Materials. Standard Test Model D 221–31; 1931. Method of Test for Water Absorption of Slate. Size of specimen, test procedure for drying, weighing, immersing and weighing.

American Society for Testing Materials. Standard Test Methods. D 222–31; 1931. Methods of Flexure Testing of Slate. Preparation of specimens, dimensions and design of knife edges, test procedure for determination of modulus of rupture and modulus of elasticity using transverse loading.

American Society for Testing Materials. D 247–27; 1927. Definition of the Term Slate.

Asphalt Shingle and Roofing Institute. Tests for Granular Surfacing Materials; 1922. For crushed slate or other mineral granules for surfacing composition roll roofing and shingles, sampling and design of sampler, test procedure for permanency of color, moisture, sieve analysis, and percentage of dust and powder.

511.51 Blackboard Slate

U. S. Gov., Dept. of Commerce. Bureau of Standards. R15; 1924. Blackboard Slate. Simplified practice recommended and accepted by industry establishing a limited list of standard heights of slabs and number of slabs to be used in various width wall spaces.

References.—Definitions, methods of sampling and of testing. *See* 511.50.

511.52 Building Slate and Slate Plumbing Fixtures

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Slate Roofing; 1927. Requirements on general quality of slate, type and weight of felt, type and size of nails, requirements for laying and nailing.

Asphalt Shingle and Roofing Institute. Granular Metric Specification for Red Slate, for Green Slate, and for Blue-Black Slate. Undated. Granules to be produced from natural nonfading slate, screen grading requirements for each of the above colors.

Pennsylvania Slate Institute. Roofing Slate; 1929. Requirements on modulus of rupture, porosity, permissible longitudinal curvature, and thickness, using Am. Soc. for Testing Materials test methods.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R13–28; 1928. Structural Slate for Plumbing and Sanitary Purposes. Simplified practice recommended and accepted by industry establishing a limited schedule of standard dimensions, sizes, types, nomenclature, and thickness of slab for slate laundry tubs, sink and tub combinations, slate sinks, sink tops, slop hoppers, shower stalls, toilet inclosures, and urinals.

U. S. Gov. Dept. of Commerce. Bureau of Standards. R14–28; 1928. Roofing Slate. Simplified practice recommended and accepted by industry establishing a limited list of standard face dimensions and thicknesses for slate shingles for sloping roofs and for flat roofs, number of nail holes, and standard color nomenclature.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Bath Inclosures with and without Lead Pan. For shower bath and dressing room inclosures of marble, slate, soapstone, or glass, dimensions of slabs and of assembled inclosures, details of joints, construction requirements for concrete floor foundation and for placing lead pan, general quality and finish requirements for slate and soapstone.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Water-Closet Inclosures and Partitions. For marble, slate, soapstone, or glass, dimensions of slabs and of assembled inclosures and partitions, general quality and finish requirements for slate and soapstone.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures. (For Land Use). Slate or Soapstone Sinks. General dimensions, thickness of slate or soapstone, size and type of bibbs, combinations of sink with right and left hand drain boards, general quality and finish requirements for slate and soapstone.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Slate or Soapstone Laundry Trays. For 1, 2, and 3 compartment trays, general dimensions and construction, thickness of slate or soapstone, angle iron supports from floor, sizes and types of fittings for supply and waste, general quality and finish requirements for slate and soapstone.

References.—Definitions, methods of sampling and of testing. *See also* 511.50. Roofing construction. *See also* 518.57.

511.53 Slate for Electrical Purposes

American Railway Assn. Signal Section. 10720; 1921. Switchboard. Includes slate panel, general quality, finish, and dimensions, dielectric strength requirements according to Am. Inst. of Elec. Engrs. Rules.

American Society for Testing Materials. Tentative Test Methods. D 273–27T; 1927. Methods of Test for Determining the Insulating Qualities of Slate. Apparatus requirements, test procedure for measuring impedance leakage current by measuring the current in low voltage winding of testing transformer.

References.—Definitions, methods of sampling and of testing. *See also* 511.50. Electrical panels and switchboards. *See also* 714.4. Telephone switchboards. *See* 718.22. Fuse blocks. *See* 714.22. Switches and switch bases. *See* 714.52. Cut-out bases. *See* 714.22. Methods of testing insulating qualities. *See also* 719.50.

511.6 SOAPSTONE

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Bath Inclosures with and without Lead Pan. For shower bath and dressing room inclosures of marble, slate, soapstone, or glass, dimensions of slabs and of assembled inclosures, details of joints, construction requirements for concrete floor foundation and for placing lead pan, general quality and finish requirements for slate and soapstone.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Water-Closet Inclosures and Partitions. For marble, slate, soapstone, or glass, dimensions of slabs and of assembled inclosures and partitions, general quality and finish requirements for slate and soapstone.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Slate or Soapstone Sinks. General dimensions, thickness of slate or soapstone, size and type of bibbs, combinations of sink with right and left hand drain boards, general quality and finish requirements for slate and soapstone.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Slate or Soapstone Laundry Trays. For 1, 2, and 3 compartment trays, general dimensions and construction, thickness of slabs, angle iron supports from floor, sizes and types of fittings for supply and waste, general quality and finish requirements for slate and soapstone.

511.7 ROCK AND STONE FOR ROAD BUILDING

511.70 General Items

American Assn. of State Highway Officials. Tentative Method. T–2. Undated. Methods of Sampling Stone, Slag, Gravel, Sand, and Stone Block for Use as Highway Materials, Including Some Material Survey Methods. Same as D 75–22 of Am. Soc. for Testing Materials except that the words "or in some other satisfactory manner" in paragraph 16 of D 75–22 have been omitted.

American Assn. of State Highway Officials. Tentative Method. T–5. Undated. Method of Test for Toughness of Rock. Same as D 3–18 of Am. Soc. for Testing Materials.

American Society for Testing Materials. D 35–18; 1918. Form of Specifications for Certain Commercial Grades of Broken Stone. Form for entering the percentages passing certain specified screen sizes.

511.71 Stone and Granite Blocks

American Assn. of State Highway Officials. Tentative Standard Specifications. M–1; 1924. Stone for Telford Base Course and Reconstructed Base Course. Requirements on general quality of stone and of approximate dimensions of pieces.

American Society for Testing Materials. D 59–26; 1926. Block for Granite Block Pavements. General quality of stone block, percentage of wear and toughness requirements using A. S. T. M. methods of test, dimensions of blocks, dressing.

American Society for Testing Materials. D 131–23; 1923. Block for Recut Granite Block Pavements. General quality of block, percentage of wear and toughness requirements using A. S. T. M. methods of test, limiting dimensions, dressing.

American Society for Testing Materials. D 132–23; 1923. Block for Durax Granite Pavements. General quality, percentage of wear, and toughness requirements, using A. S. T. M. methods of test, limiting dimensions, dressing.

U. S. Gov., Federal Specifications Board. SS–G–651; 1931. Block for Granite, Recut Granite, and Durax Granite Pavements. For 3 grades of granite block, 1 grade of recut, and 2 grades of durax blocks, requirements on dressing, percentage of wear, toughness, and dimensions, using test methods of Am. Soc. for Testing Materials. Requirements are the same as for A. S. T. M. spec. D59–26, D131–23, D132–23 except for dimensions of durax blocks, and the addition of a C grade in granite block.

References.—Definitions, methods of sampling and of testing. *See also* 500, 510, 511.70. Granite, limestone, sandstone. *See also* 511.1, 511.2, 511.4. Cast stone. *See* 516.4. Stone block pavements. *See* 518.36.

511.72 Riprap

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures. 1931. Rip-rap. Requirements on general quality and weight of stone, proportion of large stones, general construction requirements for 2 classes of dry rip-rap, for mortar and for grouted rip-rap, construction of stone rip-rap for foundation protection, filling and placing concrete rip-rap in bags.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Hand-Laid Rip-Rap. Requirements on general quality, minimum thickness and volume of stone, method of laying and permissible variation of finished work from required contour.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 511.70. Riprap. *See also* 511.9. Granite, limestone, sandstone. *See also* 511.1, 511.2, 511.4. Retaining and head walls. *See also* 518.66. Rubble and ashlar masonry. *See* 518.81, 518.82.

511.73 Railway Ballast

American Electric Railway Engr. Assn. Misc. Methods and Practices. W202–23; 1923. Ballast for Suburban and Interurban Lines. Definitions and descriptions with recommendations as to best type of ballast and minimum depths for different types of ballast.

American Railway Engineering Assn. 1929 Manual. Burnt Clay Ballast; 1921. Location of deposit, procedure for burning, maximum recommended size and absorption of broken burnt clay, minimum depth of ballast in roadbed.

American Railway Engineering Assn. 1929 Manual. Pit Run Gravel Ballast; 1921. Allowable percentages of dust or sand for unwashed gravel for three classes of railways, test method for separating and measuring percentage of dust, sand, and gravel, dimensions of roadway ballast sections.

American Railway Engineering Assn. 1929 Manual. Washed Gravel Ballast; 1926. Percentage of material in each size range for washed gravel including crushed gravel, test requirements for amount of dirt or loam, amount of oversize coarse aggregate, amount of undersize sand, and percentages of the various sizes, dimensions of roadway ballast sections.

American Railway Engineering Assn. 1929 Manual. Stone Ballast; 1925. Test methods for measurement of weight, toughness, wearing qualities, cementing quality, soundness test requirements, size limits, production and handling, dimensions of roadway ballast sections.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 511.70, 512.10. Gravel, sand, broken stone, slag. *See also* 512.11, 512.12, 512.15, 512.2.

511.9 MISCELLANEOUS STONE AND STONE MANUFACTURES

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Ashlar Stone. Rubble Stone. Rip-Rap Stone. Requirements on general quality and nonadmissible defects for each type.

American Institute of Mining and Metallurgical Engineers, sponsor under auspices of American Standards Assn. M 13–1925. Recommended Practice for Rock Dusting Coal Mines to Prevent Coal Dust Explosions. Kind, size, and amounts of dust to be used, parts of mine to be dusted, sampling of dust after mine has been dusted, for all bituminous mines.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 511.70.

512. SAND, GRAVEL, BROKEN STONE, SLAG

512.1 SAND, GRAVEL, BROKEN STONE

512.10 General Items

American Assn. of State Highway Officials. Tentative Method. T–2. Undated. Methods of Sampling Stone, Slag, Gravel, Sand, and Stone Block for Use as Highway Materials, Including Some Material Survey Methods. Same as D 75–22 of Am. Soc. for Testing Materials except that the words "or in some other satisfactory manner" in paragraph 16 of D 75–22 have been omitted.

American Assn. of State Highway Officials. Tentative Method. T–3. Undated. Methods of Test for Abrasion of Broken Stone and Broken Slag. A modification in some respects of D 2–26 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–12. Undated. Method of Decantation Test for Sand and Other Fine Aggregates. Same as D 136–22T of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–13. Undated. Method of Test for Apparent Specific Gravity of Sand, Stone, and Slag Screenings, and Other Fine

Nonbituminous Highway Materials. Same as D 55–25 of Am. Soc. for Testing Materials for the Le Chatelier test, not accurate for samples containing a relatively large proportion of absorptive grains.

American Assn. of State Highway Officials. Tentative Method. T–15. Undated. Method of Test for Apparent Specific Gravity and Absorption or Free Moisture Content of Sand, Gravel, Stone, or Other Nonbituminous Highway Materials. For pycnometer method, requirements on general features of pycnometer, test procedure.

American Assn. of State Highway Officials. Tentative Method. T–19. Undated. Method of Test for Unit Weight of Aggregate for Concrete. Same as C 29–27 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–27. Undated. Method of Test for Sieve Analysis of Aggregates for Concrete. For coarse or for mixtures of fine and coarse aggregates, method the same as C 41–24 of Am. Soc. for Testing Materials except as to size of sample and recommendation of elutriation test in T–27.

American Assn. of State Highway Officials. Tentative Method. T–38. Undated. Method of Proportioning Natural Sand and Gravel for Concrete Construction. Method for determining the amount of cement to make concrete equivalent to any base mixture, when the percentage of sand in the total aggregate varies from the base mixture.

American Assn. of State Highway Officials. Tentative Method. T–71. Undated. Method of Test for Sand to be Used as Fine Aggregate in Concrete. For determining the structural strength of sands by means of a compression test on a mortar of plastic consistency and gaged to a definite water cement ratio of 0.9, requirements on measurement of consistency on flow table and preparation of compression test specimens.

American Society for Testing Materials. C 29–27; 1927. Method of Test for Unit Weight of Aggregate for Concrete. Dimensions, shape, and capacities of measuring containers, dimensions of metal tamping rod, calibration of measure, method of filling measure and determining the unit weight of aggregate.

American Society for Testing Materials. C 30–22; 1922. Approved by American Standards Assn. as A 19–1923. Method of Test for Determination of Voids in Fine Aggregate for Concrete. Formula for determination of percentage of voids with definitions of terms.

American Society for Testing Materials. C 40–27; 1927. Method of Test for Organic Impurities in Sands for Concrete. As a warning that further tests of the sands are necessary before approval for use; preparation of mixture of sand and of sodium hydroxide solution and comparison of color after 24 hours with that of a standard tannic acid solution.

American Society for Testing Materials. C 41–24; 1924. Method of Test for Sieve Analysis of Aggregates for Concrete. Requirements on sizes of samples for fine aggregates and for coarse aggregates, sizes of openings and of wires in sieves, method of separating and reporting analysis of the samples.

American Society for Testing Materials. C 58–28; 1928. Definition of the Term Sand.

American Society for Testing Materials. Tentative Definition. C 58–28T; 1928. Definition of Term Aggregate.

American Society for Testing Materials. D 19–16; 1916. Method of Mechanical Analysis of Mixtures of Sand or other Fine Material with Broken Stone or Broken Slag, Except Aggregates Used in Cement Concrete. Dimensions of sample, screen separation of sample, examining portion retained on screen by A. S. T. M. test method D 18, and the portion passing the screen by A. S. T. M. method D 7.

American Society for Testing Materials. D 30–18; 1918. Approved by American Standards Assn. as A 27–1924. Method of Test for Apparent Specific Gravity of Coarse Aggregates. Size and screening of sample, apparatus, test method.

American Society for Testing Materials. D 55–25; 1925. Methods of Test for Apparent Specific Gravity of Sand, Stone and Slag Screenings, and Other Fine Nonbituminous Highway Materials. Alternate methods, Le Chatelier, and Jackson, dimensions and design of testing apparatus and test procedure for each method.

American Society for Testing Materials. Tentative Standard. C 86–31T; 1931. Method of Test for Apparent Specific Gravity of Coarse Aggregates in a Saturated Condition. Test procedure and calculation of apparent specific gravity.

American Society for Testing Materials. Tentative Standard. C 87–31T; 1931. Method of Test for Structural Strength of Fine Aggregate Using Constant Water-Cement-Ratio Mortar. Requirements on preparation of mortar using a 0.9 water-cement ratio, procedure for making flow test for determining consistency of mortar, procedure for molding compression specimens.

American Society for Testing Materials. Tentative Specifications. D 64–20T; 1920. Commercial Sizes of Sand and Gravel for Highway Construction. Standard size designations and maximum permissible range in mechanical analyses for nine commercial grades of sand and gravel for waterbound gravel and cement concrete roads and pavements.

American Society for Testing Materials. D 2–26; 1926. Abrasion of Rock. Similar in almost all respects to the Deval abrasion test of the French School of Roads and Bridges, dimensions and design of machine, preparation of sample, test procedure for testing broken stone for obtaining the coefficient of wear.

American Society for Testing Materials. Tentative Test Method. D 289–28T; 1928. Method of Test for Abrasion of Gravel. For uncrushed and crushed gravel, dimensional requirements of Deval abrasion testing machine, dimensions and weight of cast iron abrasive spheres, preparation of sample and separation into grade class, test procedure.

U. S. Gov., Dept. of Commerce. Bureau of Standards. LC 248; 1928. Sintering Test of Molding Sand. For finding temperature at which the molding sand "burns on" the casting, requirements on preparation of samples, methods of test and illustration of apparatus using a heated platinum ribbon and measuring the temperature at which it sticks to the specimen.

512.11 Gravel

American Assn. of State Highway Officials. Tentative Standard Specifications. M–37; 1930. Gravel for Portland Cement Concrete Pavements or Bases, Highway Bridges and Incidental Structures. For use as coarse aggregate, requirements on general quality, permissible deleterious substances, wear, size, and uniformity of size using A. A. S. H. O. methods of test.

American Assn. of State Highway Officials. Tentative Method. T–4. Undated. Method of Test for

Abrasion of Gravel. Requirements on screening of sample and preparation according to one of four standard grade classes, size of sample, duration of test in Deval abrasion testing machine, speed of machine, measurement of loss by abrasion; for gravel without crushed pieces and for gravel with crushed pieces.

American Assn. of State Highway Officials. Tentative Method. T–6. Undated. Method of Test for Toughness of Gravel. Preparation of sample and height of fall for machine described in Proceedings of Am. Soc. for Testing Material for 1922 by F. H. Jackson, "An Impact Test for Gravel."

American Assn. of State Highway Officials. Tentative Method. T–7. Undated. Method of Determining Quality of Glacial Gravels by Lithological Count of Particles. Method dependent on separation by inspection of a sample into the various rock types.

American Assn. of State Highway Officials. Tentative Method. T–8. Undated. Method Of Test for Quantity of Soft Pebbles in Gravel. Requirements on separation of sample into 3 sizes and crushing the soft pebbles by specified loads for each size class, computation of percentage by weight.

American Assn. of State Highway Officials. Tentative Method. T–11. Undated. Method of Test for Quantity of Clay and Silt in Gravel. Same as D 72–21 of Am. Soc. for Testing Materials.

American Concrete Institute. Tentative Method. Method of Test for Abrasion of Gravel; 1928. Defines grades and tests in Deval abrasion machine. Proc. of A. C. I. for 1928, vol. 24, p. 783.

American Railway Engineering Assn. 1929 Manual. Concrete Fence Posts; 1923. Includes bank gravel for fine and coarse aggregate for concrete, general quality, size ranges, test requirements for organic impurities.

American Society of Municipal Engineers. Proposed Specifications for Broken Stone and Gravel Roads; 1922. For gravel road, requirements on general quality of gravel, permissible content of disintegrated stone, required proportions of sizes of materials as determined by screen grading for a No. 1 product and a No. 2 product comprising mixtures of gravel, sand, and clay, cementation test for No. 1 product using method recommended by the special committee on "Materials for Road Construction" of the American Society of Civil Engineers, 1916.

American Society for Testing Materials. Tentative Specifications. D 64–20T; 1920. Commercial Sizes of Sand and Gravel for Highway Construction. Standard size designations and maximum permissible range in mechanical analyses for nine commercial grades of sand and gravel, when used in construction of waterbound-gravel and cement concrete roads and pavements.

American Society for Testing Materials. D 72–21; 1921. Method of Test for Quantity of Clay and Silt in Gravel for Highway Construction. Dimensions of test vessel, size of sample, test procedure.

American Society for Testing Materials. D 309–30; 1930. Gravel for Bituminous Concrete Base. For ¼ to 1¼ inch size and for ¼ to 2½ inch size, general quality, permissible amounts of deleterious substances, screen grading requirements.

National Sand and Gravel Assn. (Inc.). Report of Committee on Specifications for Standardized Sizes of Sand and Gravel; 1931. Includes proposed standard commercial sizes of gravel with standard designations for sizes, permissible coarser material and permissible finer material than the limits set.

U. S. Gov., Federal Specifications Board. 455; 1927. Broken Stone, Broken Slag, or Gravel for Bituminous Surface Treatment. Requirements on general qualities of materials, sizes, and screen grading, methods of test are those of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board. 82; 1924. Surfacing Materials for Bituminous Built-Up Roofing. For roofing gravel, requirements on general quality and sieve grading, methods of sampling and test.

References.—Definitions, methods of sampling and of testing. *See also* 500, 510, 511.70, 512.10. Railway ballast. *See* 511.73. Fine and coarse aggregate. *See also* 512.13, 512.14. Gravel for concrete, concrete bricks and blocks, concrete sidewalks, concrete poles and posts. *See also* 516.3, 516.4, 516.5, 516.9. Gravel for road construction and pavement. *See* items under 518.1, 518.2, 518.3. Gravel for bridges and piling. *See also* 518.4. Gravel for buildings and parts of buildings. *See* items under 518.5. Gravel for drainage structures, concrete drain and sewer pipe. *See also* 518.6. Gravel for tanks and concrete masonry. *See also* items under 518.7, 518.8.

512.12 Sand

American Assn. of State Highway Officials. Tentative Standard Specification. M–6a; 1927. Mortar Sand. Requirements on general quality, permissible clay and silt, permissible organic matter, mortar strength test, screen grading, using A. A. S. H. O. methods of test T–10, T–12, T–21, T–27, T–35.

American Assn. of State Highway Officials. Tentative Standard Specifications. M–129; 1926. Sand for Bituminous Mixtures. For use in bituminous pavements, bituminous mortars, bituminous filler or mastics, requirements on general quality, screen grading limits, using A. A. S. H. O. methods of test.

American Assn. of State Highway Officials. Tentative Method. T–21. Undated. Method of Test for Organic Impurities in Sands for Concrete. Same as C 40–27 of Am. Soc. for Testing Materials except that the use of commercial soda lye is permitted and provision is made for comparing the colors with a color chart in T–21.

American Assn. of State Highway Officials. Tentative Method. T–28. Undated. Method of Mechanical Analysis of Sand or Other Fine Highway Material. Same as D 7–27 of Am. Soc. for Testing Materials except as to size of sample and recommendation of elutriation test in T–28.

American Ceramic Society. Journal of A. C. S. for June 1928. Tentative Method. Complete Sand Analysis; 1928. Preparation and dissolving of sample, method of determination of R_2O_3, CaO, MgO, and loss on ignition, determination of iron, zirconia, alumina, silica, and electrometer method for iron in glass sands.

American Foundrymens Assn. Methods of Testing and Grading Foundry Sands; 1928. Determination of moisture, definitions, descriptions of apparatus, standard methods of performing permeability test, compression strength (green sand), fineness test, chemical analysis. Tentative standard tests for transverse, tensile, and shear strength of green sand, tensile and transverse strength test of baked cores, dye absorption and sintering tests, grading classifications.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Railway Buildings, Sec. 21. Brick Pavements and Floors. For cushion sand, requirements on general quality, freedom from clay, organic matter, shale or alkali, maximum size of particle, screen grading requirements.

American Railway Engineering Assn. 1929 Manual. Concrete Fence Posts; 1923. Includes sand for fine aggregate, general quality, test requirements for organic impurities.

American Society of Municipal Engineers. Vitrified Brick Pavements; 1930. Sand. Sand for sand bed for brick pavements, and sand for cement sand bed, requirements on general quality, allowable loam or silt, screen grading.

American Society for Testing Materials. C 35–30; 1930. Gypsum Plastering Sand. General quality, composition, and screen grading sizes.

American Society for Testing Materials. Tentative Specifications. C 66–31T; 1931. Sand for Use in Lime Plaster. General quality and grading requirements, permissible organic impurities, sieve analysis according to A. S. T. M. test method C 41, decantation test according to A. S. T. M. method D 136, and organic impurities according to A. S. T. M. method C 40.

American Society for Testing Materials. D 7–27; 1927. Method of Mechanical Analysis of Sand or Other Fine Highway Material, Except Fine Aggregates Used in Cement Concrete. Size and preparation of sample, sieving procedure with sieve dimensions for various sizes of sieves.

American Society for Testing Materials. Tentative Specifications. D 64–20T; 1920. Commercial Sizes of Sand and Gravel for Highway Construction. Standard size designations and maximum permissible range in mechanical analyses for nine commercial grades of sand and gravel, when used in construction of waterbound gravel and cement concrete roads and pavements.

American Society for Testing Materials. D 162–29; 1929. Sand for Sheet Asphalt and Bituminous Concrete Pavements. General quality requirements, limiting percentages passing and retained on various sieve sizes, grading according to A. S. T. M. method D 7 and sampling according to A. S. T. M. method of D 75.

American Society for Testing Materials. D 136–28; 1928. Method of Decantation Test for Sand and Other Fine Aggregates. For determination of total quantity of silt, loam, clay, etc., dimensions of pan, preparation of sample, test, procedure.

National Sand and Gravel Assn. (Inc.). Report of Committee on Specifications for Standardized Sizes of Sand and Gravel; 1926. Includes a table of suggested standard commercial sizes of sand and gravel for specific types of work such as for maintenance of gravel roads, concrete highway construction, railroad ballast, etc.

U. S. Gov., Federal Specifications Board. SS–S–71; 1931. Sands for Use in Sheet Asphalt or Bituminous Concrete Pavements. Requirements are the same as those of Am. Soc. for Testing Materials, Spec. D 162–29 for sand for sheet asphalt and bituminous concrete pavements.

U. S. Gov., Federal Specifications Board. SS–S–61; 1931. Sand for Cement Grout Filler, for Brick and Stone Block Pavements. Requirements on general quality, sieve grading, tensile strength of mortar, using methods of test of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board. 462; 1927. Sand for Cement Mortar Bed for Brick, Stone Block, or Wood Block Pavements. Requirements on general qualities, screen grading, and tensile strength of mortar briquettes, methods of test being those of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board. SS–M–51; 1931. Materials for Cushion Course for Brick, Stone Block, or Wood Block Pavement. For sand, granulated slag, slag screenings, or limestone screenings requirements on screen grading, and permissible silt, loam, clay, etc., using test methods of Am. Soc. for Testing Materials.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 511.70, 512.10. Sand for mineral fillers. *See also* 512.16. Fine aggregate. *See also* 512.13. Sand for plasters. *See also* 514.3, 514.4, 514.5, 514.6. Sand for stucco, concrete and mortar, concrete bricks and blocks, concrete sidewalks, concrete poles and posts. *See also* 516.2, 516.3, 516.4, 516.5, 516.9. Sand for road construction and pavement. *See also* items under 518.1, 518.2, 518.3. Sand for bridges and piling. *See also* 518.4. Sand for buildings. *See* items under 518.5. Sand for drainage structures, concrete drain and sewer pipe. *See also* 518.6. Sand for tanks and concrete masonry. *See also* 518.7, 518.8. Abrasive sand. *See* 541.4. Silica mold wash for foundries. *See* 593.

512.13 Fine Aggregate

American Assn. of State Highway Officials. Tentative Standard Specifications. M–6; 1930. Fine Aggregate for Portland Cement Concrete Pavement of Base Course, Highway Bridges and Incidental Structures. Permissible deleterious substances, requirements on mortar strength, concrete strength, screen grading, and uniformity, using A. A. S. H. O. methods of test.

American Assn. of State Highway Officials. Tentative Method. T–16. Undated. Method of Test for Approximate Apparent Specific Gravity of Fine Aggregate. Same as C 68–30 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–17. Undated. Method of Test for Approximate Percentage of Voids in Inundated Fine Aggregate. Same as C 69–30 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–18. Undated. Method of Test for Surface Moisture in Fine Aggregate. Same as C 70–30 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–20. Undated. Method of Test for Determination of Voids in Fine Aggregate for Concrete. Same as C 30–22 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–30. Undated. Method of Mechanical Analysis of Extracted Aggregates. For mineral aggregate left after extraction of bituminous materials, drying and screen grading procedure.

American Assn. of State Highway Officials. Tentative Method. T–35. Undated. Methods of Making Compression and Tension Tests of Fine Aggregate for Concrete. Requirements on preparation and testing of test specimens made of fine aggregate in comparison with tests made on specimens prepared from standard Ottawa sand.

American Concrete Institute. E–5A–29T; 1929. Tentative Purchase Specifications for Concrete Aggregate. For fine aggregate, permissible percentages of deleterious materials, requirements on freedom from organic impurities, screen grading, and mortar strength compared to that of standard sand.

American Concrete Institute. Fine Aggregate, Definition of. Proc. of A. C. I. for 1923, vol. 19, p. 323.

American Railway Engineering Assn. 1929 Manual. Masonry. Portland Cement Concrete, Plain and Reinforced; 1929. Includes fine aggregate, general quality requirements, grading requirements, permissible organic impurities with method of test according to A. S. T. M.

American Railway Engineering Assn. 1929 Manual. Concrete Fence Posts; 1923. Includes fine aggregate. Sand or stone screenings, general quality, range of sizes, test requirements for organic impurities.

American Society of Municipal Engineers. Sidewalks and Curbs; 1927. Includes fine aggregate for sidewalks, general quality requirements for sand, gravel, or crushed stone, grading requirements, percentage of loam test requirements, tensile test requirements on mortar made of the fine aggregate.

American Society for Testing Materials. Tentative Specifications. C 33–31T; 1931. Concrete Aggregates. For fine aggregates, permissible amounts of various deleterious substances, screen grading, uniformity, and mortar strength. A list of the applicable A. S. T. M. methods of test is given.

American Society for Testing Materials. C 68–30; 1930. Method of Test for Determination of Approximate Apparent Specific Gravity of Fine Aggregate. For specific gravities of 2.2 to 2.85, design and graduation of special flask, preparation of sample, test procedure.

American Society for Testing Materials. C 69–30; 1930. Method of Test for Determination of Approximate Percentage of Voids in Inundated Fine Aggregate. Requirements on design, dimensions and graduation of special flask, preparation of sample, test procedure using inundation method.

American Society for Testing Materials. C 70–30; 1930. Method of Test for Determination of Surface Moisture in Fine Aggregate. For use in determination of moisture in fine aggregate for which allowance needs to be made in proportioning concrete by the maximum water content method. Method determines moisture on outside of particle. Dimensions and design of flask, preparation of sample, test procedure.

American Society for Testing Materials. D 136–28; 1928. Method of Decantation Test for Sand and Other Fine Aggregates. For determination of total quantity of silt, loam, clay, etc., dimensions of pan, preparation of sample, test procedure.

U. S. Gov., Federal Specifications Board. SS–F–51; 1931. Fine Aggregate for Portland Cement Concrete Pavement or Base. One grade, requirements on general quality of sand or other material, screen grading, permissible percentage of silt, loam, clay, etc., and strength of mortar briquettes, using methods of test of Am. Soc. for Testing Materials.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 511.70, 512.10. Gravel, sand, slag. *See also* 512.11, 512.12, 512.2. Fine aggregate for stucco, concrete, concrete bricks and blocks, concrete sidewalks, concrete poles and posts. *See also* 516.2, 516.3, 516.4, 516.5, 516.9. Fine aggregate for road construction. *See also* items under 518.2, 518.3. Fine aggregate for bridges and piling. *See also* 518.4. Fine aggregate for buildings. *See also* items under 518.5. Fine aggregate for drainage structures, concrete drain and sewer pipe. *See also* 518.6. Fine aggregate for tanks and concrete masonry. *See also* 518.7, 518.8.

512.14 Coarse Aggregate

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Rubble or Cyclopean Aggregate. For one man and derrick stone used in rubble or cyclopean concrete, requirements on general quality and percentage of wear.

American Assn. of State Highway Officials. Tentative Method. T–9. Undated. Method of Test for Soundness of Coarse Aggregate. Test for disintegration by number of times it will stand immersion in sodium sulphate solution followed by oven drying for specified time.

American Assn. of State Highway Officials. Tentative Method. T–10. Undated. Method of Test for Percentage of Shale in Aggregate. Method of separation of materials of low specific gravity by floating and skimming off in a solution of specified density.

American Assn. of State Highway Officials. Tentative Method. T–29. Undated. Method of Mechanical Analysis of Coarse Aggregate. Same as D 18–16 of Am. Soc. for Testing Materials using round hole screen.

American Concrete Institute. E 5A–29T; 1929. Tentative Purchase Specifications for Concrete Aggregate. For coarse aggregate, permissible percentages of deleterious materials, requirements on screen grading, test of strength in concrete, test of soundness, weight grades for coarse aggregate composed of slag.

American Concrete Institute. Coarse Aggregate, Definition of. Proc. of A. C. I. for 1923, vol. 19, p. 321.

American Railway Engineering Assn. 1929 Manual. Masonry. Portland Cement Concrete, Plain and Reinforced; 1929. Includes coarse aggregate, of crushed stone, gravel or slag, general quality requirements, grading and relative proportions of grades, maximum size dependent on space between reinforcement bars.

American Railway Engineering Assn. 1929 Manual. Concrete Fence Posts; 1923. Includes coarse aggregate of crushed stone or gravel, general quality, size range for line posts and for end posts.

American Society for Testing Materials. Tentative Specifications. C 33–31T; 1931. Concrete Aggregates. For coarse aggregate, permissible amounts of various deleterious substances, requirements on screen grading, durability, and for slag the weight requirements. A list of the applicable A. S. T. M. methods of test is given.

U. S. Gov., Federal Specifications Board. SS–C–571; 1931. Coarse Aggregate for Portland Cement Concrete Pavement or Base. For crushed stone, gravel, or slag, permissible kinds and amounts of deleterious substances, screen grading for each of 6 size designations, weight of slag, soundness, resistance to abrasion.

References.—Definitions, methods of sampling and of testing. *See also* 500, 510, 511.70, 512.10. Gravel, broken stone, slag. *See also* 512.11, 512.15, 512.2. Coarse aggregate for concrete, concrete bricks and blocks, concrete sidewalks, concrete poles and posts. *See also* 516.3, 516.4, 516.5, 516.9. Coarse aggregate for road construction. *See also* items under 518.2, 518.3. Coarse aggregate for bridges and piling. *See also* 518.4. Coarse aggregate for buildings. *See also* items under 518.5. Coarse aggregate for drainage structures, concrete drain and sewer pipe. *See also* 518.6. Coarse aggregate for tanks and concrete masonry. *See also* 518.7, 518.8.

512.15 Broken Stone

American Assn. of State Highway Officials. Tentative Standard Specifications. M–2; 1927. Broken Stone for Waterbound Base Course. Requirements on general quality, percentage of wear, soundness, screen grading limits for 2 sizes of broken stone and of screenings, using A. A. S. H. O. methods of testing.

American Assn. of State Highway Officials. Tentative Standard Specifications. M–4; 1926. Broken Stone for Bituminous Concrete Base Course. Requirements on general quality, percentage of wear, toughness, screen grades for 2 sizes of coarse aggregate, testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Standard Specifications. M–7; 1930. Broken Stone for Cement Concrete Base Course. For coarse aggregate, requirements on general quality, permissible deleterious material, required percentage of wear, toughness, soundness, screen grading limits, and uniformity of size, testing in accordance with A. A. S. H. O. methods of test.

American Assn. of State Highway Officials. Tentative Standard Specifications. M–9; 1927. Broken Stone for Waterbound Macadam Surface

Course. Requirements on general quality, percentage of wear, toughness, soundness, screen grading limits for coarse stone and for screenings, testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Standard Specifications. M–11; 1927. Broken Stone for Bituminous Macadam Surface Course. Requirements on general quality, percentage of wear, toughness, soundness, screen grading limits for coarse stone, filling stone, and stone chips, testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Standard Specifications. M–13; 1927. Broken Stone for Bituminous Concrete Surface Course. Requirements on general quality, percentage of wear, toughness, screen grading limits for coarse aggregate and for fine graded bituminous concrete and for coarse graded bituminous concrete, testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Standard Specifications. M–15; 1930. Broken Stone for Portland Cement Concrete Surface Courses, Highway Bridges and Incidental Structures. Requirements on general quality, permissible deleterious substances, required percentage of wear, toughness, soundness, screen grading, uniformity of size, using A. A. S. H. O. methods of test.

American Assn. of State Highway Officials. Tentative Method. T–14. Undated. Method of Test for Apparent Specific Gravity and Absorption of Stone and Other Coarse Materials. Requirements on preparation of sample, dimensions and design of test vessel, test procedure.

American Society of Municipal Engineers. Proposed Specifications; 1922. Broken Stone and Gravel Roads With and Without Bituminous Surface Treatment. For stone roads, general quality, coefficient of wear, toughness, and screen grading requirements for broken stone.

American Society for Testing Materials. D 18–16; 1916. Method of Mechanical Analysis of Broken Stone or Broken Slag, Except Aggregates Used in Cement Concrete. Preparation of sample and screening procedure through prescribed sizes and order of use of screens.

American Society for Testing Materials. Tentative Specifications. D 63–23T; 1923. Commercial Sizes of Broken Stone and Broken Slag for Highway Construction. Standard size designations and maximum permissible range in mechanical analyses for nine commercial grades of broken stone and broken slag for highway construction.

American Society for Testing Materials. Tentative Specifications. D 190–29T; 1929. Broken Stone for Waterbound Base. General quality, percentage of wear, and grading requirements for 3 sizes of coarse aggregate and 2 sizes of screenings, using A. S. T. M. methods D 2, D 18, and D 75.

American Society for Testing Materials. D 191–29; 1929. Broken Stone for Waterbound Macadam Surface Course. General quality, percentage of wear and toughness requirements, grading requirements for coarse stone and for screenings, according to A. S. T. M. test methods D 2, D 3, D 18, and according to D 75 for sampling methods.

American Society for Testing Materials. D 192–29. Broken Stone for Bituminous Macadam. For surface or base course, general quality, percentage of wear, and toughness requirements, grading requirements for coarse stone, stone for filling surface voids, and for stone chips, according to A. S. T. M. test methods D 2, D 3, and D 18, sampling according to A. S. T. M. method D 75.

American Society for Testing Materials. Tentative Specifications. D 193–29T; 1929. Broken Stone for Bituminous Concrete Base. General quality, percentage of wear, toughness, and grading requirements for open mix and for closed mix bituminous concrete base, in accordance with A. S. T. M. test methods D 2, D 3, D 18, and D 75.

American Society for Testing Materials. D 194–29; 1929. Broken Stone for Bituminous Concrete Surface. General quality, percentage of wear, and toughness requirements, grading requirements for stone chips for seal coat, and for coarse aggregate for both fine graded and coarse graded concrete mixtures, according to A. S. T. M. methods D 2, D 3, and D 18, sampling according to D 75.

U. S. Gov., Federal Specifications Board. 455; 1927. Broken Stone, Broken Slag, or Gravel for Bituminous Surface Treatment. Requirements on general qualities of materials, sizes, and screen grading, testing according to methods of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board. 456; 1927. Broken Stone and Broken Slag for Waterbound Base and Wearing Course. For 4 sizes of broken stone, requirements on general quality, screen grading, percentage of wear, testing according to methods of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board. 457; 1927. Broken Stone and Broken Slag for Bituminous Macadam Base or Surface Course. For 3 size grades for base course and 1 size grade for surface course, for broken stone or broken slag, requirements on general quality, screen grading, percentage of wear for stone, and unit weight for slag, using Am. Soc. for Testing Materials methods of test.

U. S. Gov., Federal Specifications Board. 458; 1927. Broken Stone and Broken Slag for Bituminous Concrete Base or Surface Course. For 5 size grades, requirements on percentage of wear, toughness, and screen grading of broken stone, and unit weight and screen grading of broken slag, using methods of test of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board. 459; 1927. Broken Stone and Broken Slag for Binder Course, Sheet Asphalt Pavement. Requirements on general quality, toughness, and screen grading of broken stone, unit weight and screen grading of broken slag, using methods of test of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board. 82; 1924. Surfacing Materials for Bituminous Built-Up Roofing. For crushed stone, requirements on general quality and sieve grading, methods of sampling and test.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 511.70, 512.10. Railway ballast. *See also* 511.73. Fine and coarse aggregates. *See also* 512.13, 512.14. Broken stone for concrete, concrete bricks and blocks, concrete sidewalks, concrete poles and posts. *See also* 516.3, 516.4, 516.5, 516.9. Broken stone for road construction. *See also* items under 518.1, 518.2, 518.3. Broken stone for bridges and piling. *See also* 518.4. Broken stone for buildings. *See also* items under 518.5. Broken stone for drainage structures, concrete drain and sewer pipe. *See also* 518.6. Broken stone for tanks and concrete masonry. *See also* 518.7, 518.8.

512.16 Mineral Fillers

American Assn. of State Highway Officials. Tentative Standard Specifications. M–17; 1924. Mineral Filler. For use in construction of sheet asphalt or bituminous concrete pavements. For Portland cement or approved dust, requirements on general quality, sieve grading, testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Method. T–36. Undated. Method of Sampling Mineral Filler. Sampling the same as for Portland cement received in carload lots.

American Assn. of State Highway Officials. Tentative Method. T–37. Undated. Method for Determination of Fineness of Mineral Filler. Procedure using 200 mesh sieve and hand method of analysis.

American Society for Testing Materials. D 57–20; 1920. Approved by American Standards Assn. as A 31–1924. Materials for Cement Grout Filler for Brick and Stone Block Pavements. General quality and grading requirements for sand, test requirements for tensile strength for cement mortar made with the sand to specified proportions, cement according to A. S. T. M. specifications for Portland cement.

American Society for Testing Materials. Tentative Specifications. D 242–26T; 1926. Mineral Filler for Sheet Asphalt and Bituminous Concrete Pavements. Composed of limestone dust, Portland cement, or other material, sieve analysis requirements in accordance with A. S. T. M. test method D 7.

U. S. Gov., Federal Specifications Board. SS–M–351; 1931. Mineral Filler for Sheet Asphalt or Asphaltic Concrete Pavements. For limestone dust, dolomite dust or Portland cement, requirements on sieve grading, using methods of test of Am. Soc. for Testing Materials.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 511.70, 512.10. Sand. *See also* 512.12. Bituminous fillers. *See* 505.15.

512.2 SLAG

American Assn. of State Highway Officials. Tentative Standard Specifications. M–3; 1927. Broken Slag for Waterbound Base Course. Requirements on general quality, percentage of wear, weight, screen grading limits for coarse slag and screenings, testing in accordance with A. A. S. H. O. methods of test.

American Assn. of State Highway Officials. Tentative Standard Specification. M–10; 1927. Broken Slag for Waterbound Surface Course. Requirements on general quality, percentage of wear, weight, screen grading limits for coarse slag and for screenings, testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Standard Specifications. M–12; 1929. Broken Slag for Bituminous Macadam Surface Course. Requirements on general quality, percentage of wear, weight, screen grading limits for coarse slag, void filling slag, and slag chips, testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Standard Specifications. M–14; 1927. Broken Slag for Bituminous Concrete Surface Course. Requirements on general quality, percentage of wear, weight, screen grading limits for 2 sizes applicable to fine graded and to coarse graded bituminous concrete, testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Standard Specifications. M–16; 1930. Broken slag for Portland Cement Concrete Base and Surface Course. For coarse aggregate, requirements on general quality, permissible deleterious substances, required unit weight, screen grading, uniformity of size, using A. A. S. H. O. methods of test.

American Concrete Institute. Crushed Slag, Definition of. Proc. of A. C. I. for 1923, vol. 19, p. 322.

American Railway Engineering Assn. 1929 Manual. Masonry. Portland Cement Concrete, Plain and Reinforced; 1929. Includes slag as coarse aggregate, air cooled, minimum weight, seasoning and grading requirements.

American Society for Testing Materials. Tentative Specifications. C 33–31T; 1931. Concrete Aggregates. For slag, permissible amounts of various deleterious substances, requirements on screen grading, weight, and durability. A list of the applicable A. S. T. M. methods of test is given.

American Society for Testing Materials. D 18–16; 1916. Method of Mechanical Analysis of Broken Stone or Broken Slag, Except Aggregates Used in Cement Concrete. Preparation of sample and screening procedure through prescribed sizes and order of use of screens.

American Society for Testing Materials. Tentative Specifications. D 63–23T; 1923. Commercial Sizes of Broken Stone and Broken Slag for Highway Construction. Standard size designations and maximum permissible range in mechanical analyses for 9 commercial grades of broken stone and broken slag.

American Society for Testing Materials. D 65–23; 1923. Broken Slag for Waterbound Base and Wearing Course. Covers air cooled blast-furnace slag, general quality, weight, percentage of wear, and grading requirements using A. S. T. M. methods of test, for screenings and coarse slag.

American Society for Testing Materials. D 66–23; 1923. Shovel-Run or Crusher-Run Broken Slag for Waterbound Base. Covers air cooled blast-furnace slag, general quality requirements, weight, percentage of wear, grading requirements according to A. S. T. M. methods of test.

American Society for Testing Materials. D 159–27; 1927. Broken Slag for Bituminous Macadam Wearing Course. For air cooled blast-furnace slag, general quality, weight, screen grading sizes, using A. S. T. M. test methods.

American Society for Testing Materials. D 160–27; 1927. Broken Slag for Bituminous Concrete (Coarse Graded Aggregate Type). For road wearing course constructed by mixing method, using air cooled blast-furnace slag, general quality, weight, and screen grading requirements using A. S. T. M. methods.

American Society for Testing Materials. D 161–27; 1927. Broken Slag for Bituminous Concrete (Fine Graded Aggregate Type). For bituminous concrete road wearing surface, general quality, weight, and screen grading requirements for the slag using A. S. T. M. methods of test.

American Society for Testing Materials. D 195–27; 1927. Broken Slag for Bituminous Macadam Base. Grade sizes for different courses, general quality, weight, using A. S. T. M. methods of test.

American Society for Testing Materials. D 196–27; 1927. Broken Slag for Bituminous Concrete Base. Air cooled blast-furnace slag for road base, general quality, weight, screen grading requirements, using A. S. T. M. test methods.

American Society for Testing Materials. Tentative Specifications. C 33–28T; 1928. Concrete Aggregates. Includes coarse aggregates of blast furnace slag, general quality, permissible deleterious substance grading, durability, and minimum weight requirements, tests according to A. S. T. M. and Am. Assn. of State Highway Officials methods as enumerated.

National Slag Assn. Recommended Specifications. Slag to be Used in Highways and Highway Structures; 1927. For broken air cooled blast-furnace slag, requirements on weight and general quality for various applications in highway construction, for granulated slag for brick cushion and for granulated base course, requirements on screen sizes.

U. S. Gov., Federal Specifications Board 82; 1924. Surfacing Materials for Bituminous Built-Up Roofing. For roofing slag requirements on general quality and sieve grading, methods of sampling and test.

U. S. Gov., Federal Specifications Board 455; 1927. Broken Stone, Broken Slag, or Gravel for Bituminous Surface Treatment. Requirements on general qualities of materials, sizes, and screen grading, testing according to methods of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board 456; 1927. Broken Stone and Broken Slag for Waterbound Base and Wearing Course. For 4 sizes of broken slag, requirements on general quality, screen grading, and unit weight. For one grade of shovel-run or crusher-run slag, requirements on screen grading and unit weight. Tests made according to methods of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board 457; 1927. Broken Stone and Broken Slag for Bituminous Macadam Base or Surface Course. For 3 size grades for base and 1 size grade for surface course, requirements on general quality, screen grading, percentage of wear for stone, and unit weight for slag, using methods of test of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board 458; 1927. Broken Stone and Broken Slag for Bituminous Concrete Base or Surface Course. For 5 size grades, requirements on percentage of wear, toughness, and screen grading of broken stone, and unit weight and screen grading of broken slag, using methods of test of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board 459; 1927. Broken Stone and Broken Slag for Binder Course, Sheet Asphalt Pavement. Requirements on general quality, toughness, and screen grading of broken stone, unit weight and screen grading of broken slag, using methods of test of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board. SS-M-51; 1931. Materials for Cushion Course for Brick, Stone Block, or Wood Block Pavements. For sand, granulated slag, slag screenings, or limestone screenings, requirements on screen grading, permissible silt, loam, clay, etc., using test methods of Am. Soc. for Testing Materials.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10. Railway ballast. *See also* 511.73. Fine and coarse aggregates. *See also* 512.13, 512.14. See references under 512.13 and 512.14 which are in general applicable to slag. Phosphate slag as fertilizer. *See* 852.

513. SAND-LIME BRICK

American Society for Testing Materials. C 73–30; 1930. Sand-Lime Building Brick. For building brick made of sand and lime, requirements on compressive strength and modulus of rupture for 3 grades, dimensions of standard size, tests in accordance with A. S. T. M. methods C 67.

U. S. Gov., Dept. of Commerce. Bureau of Standards R38; 1925. Sand-Lime Brick. Simplified practice recommended and accepted by industry establishing one standard size of sand-lime brick.

U. S. Gov., Federal Specifications Board 505; 1927. Common Sand Lime Brick. For 3 grades of hardness, requirements on general quality, standard size, permissible variations in dimensions, absorption and transverse strength requirements, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 500., 534.10. Lime for sand lime brick. *See* 517.2. Brick pavements. *See* 518.35. Clay brick, fire brick. *See* 534.11, 534.12. Brick in building construction. *See* items under 518.5. Brick masonry. *See also* 518.83.

514. GYPSUM, GYPSUM PLASTERS, AND OTHER PLASTERS

514.0 GENERAL ITEMS

American Society for Testing Materials C 11–28; 1928. Definitions of Terms Relating to the Gypsum Industry. Includes definitions of gypsum, calcined gypsum, gypsum plastering sand, Keene's cement, mortar, plaster, stucco, etc.

American Society for Testing Materials. Tentative Definitions. C 11–31T; 1931. Definitions of Terms Relating to the Gypsum Industry. Includes definitions of aggregate, partition tile or block, gypsum plaster board, wall board, sheathing board, and lath, gypsum concrete and fiber concrete.

American Society for Testing Materials. C 26–30; 1930. Methods of Testing Gypsum and Gypsum Products. Determination of free water and of fineness, chemical analysis for combined water, carbon dioxide, silica and insoluble, iron and alumina, lime, magnesia, sulphur trioxide, and sodium chloride, consistency test of calcined gypsum, determination of time of setting, tensile, compressive, and transverse strengths, and of absorption of tile or block.

References.—Methods of lathing and plastering. *See also* 514.63.

514.1 GYPSUM

American Society for Testing Materials. C 22–25; 1925. Gypsum. Definition and chemical formula, grading requirements for run-of-mine, crushed, sized, and 4 grades of ground gypsum, chemical composition according to contract using A. S. T. M. method of test C 26.

References.—Definitions, methods of sampling and of testing. *See also* 500, 514.0. Calcined gypsum, plaster of Paris. *See also* 514.2. Gypsum plaster. *See* 514.3. Gypsum plaster board and wall board. *See* 514.61. Gypsum tiles and blocks. *See* 514.62.

514.2 CALCINED GYPSUM (Plaster of Paris)

American Dental Assn. Tentative Specification No. 2; 1930. Dental Inlay Casting Investment. Published in Vol. XVII of Journal of Am. Dental Assn. for Dec. 1930. For a powder essentially plaster of Paris and silica, requirements on freedom from foreign material and partly set lumps, absence of cracking when heated, ability to cast with alloy, freedom from poisonous odors, setting expansion, thermal expansion, compressive strength, time of set, and screen grading of powder, methods of test.

American Society for Testing Materials. C 23–30; 1930. Calcined Gypsum. Grade sizes and fineness of material, time of setting, tensile and compressive strength requirements for calcined gypsum according to A. S. T. M. test method C 26.

American Society for Testing Materials. C 61–30; 1930. Keene's Cement. Comprises anhydrous calcined gypsum, the set of which is accelerated by addition of other materials. Time of setting, tensile strength, fineness, and maximum water content requirements, sampling, method of determination of chemical and physical properties a modification of A. S. T. M. method C 26.

American Society for Testing Materials. C 72–30; 1930. Calcined Gypsum for Use in the Preparation of Dental Plasters. For quick setting, medium setting, and slow setting grades, requirements on percentage of calcined gypsum, time of setting, tensile strength, fineness, and dryness, tested according to a modification of A. S. T. M method C 26.

U. S. Gov., Federal Specifications Board. SS–G–901; 1930. Calcined Gypsum. For a fine grade and a medium grade, requirements on chemical composition, tensile and compressive strengths fineness, time of set, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 300; 1925. Plaster of Paris Bandage. For 3 sizes, requirements on dimensions, general quality and time of setting of plaster of Paris, weight of plaster per bandage, packing, gauze used to meet requirements of type A given in F. S. B. Spec. 289. for plain gauze.

References.—Definitions, methods of sampling and of testing. *See also* 500., 514.0. Gypsum. *See also* 514.1. Packaging of dental investments. *See* 915.10.

514.3 GYPSUM PLASTER

American Society for Testing Materials. C 28–30; 1930. Gypsum Plasters. Definition, composition, time of setting, and tensile strength requirements for first and second coat of gypsum ready-sanded plaster, of neat plaster, of wood-fibered plaster, and of calcined gypsum for finishing coat, using A. S. T. M. test methods C 26.

American Society for Testing Materials. C 59–30; 1930. Gypsum Molding Plaster. For making interior embellishments, cornices, etc., requirements on percentage of calcined gypsum, time of setting, tensile strength, and sampling using A. S. T. M. test method C 26.

American Society for Testing Materials. C 60–30; 1930. Gypsum Pottery Plaster. Calcined gypsum for making pottery molds, requirements on percentage of calcined gypsum, time of setting, tensile strength, fineness, and sampling requirements, using A. S. T. M. test method C 26.

Gypsum Assn. Gypsum Plasters; 1927. Requirements on general quality of water and sand, plaster to be equal in quality and composition to A. S. T. M. Spec. C 28, proportions and mixing for various coats on various base types for neat plaster, wood-fibered, ready-sanded, and finishing plaster, thickness of application of neat plaster.

U. S. Gov., Federal Specifications Board. SS–P–401; 1931. Gypsum Plaster. For wood fibered plaster. neat plaster, sanded brown coat plaster, and sanded scratch coat plaster, requirements on content of gypsum, wood fiber, and sand, time of set, and tensile strength, methods of test, gypsum to conform to F. S. B. Spec. SS–G–901.

References.—Definitions, methods of sampling and of testing. *See also* 500., 514.0. Sand. *See also* 512.12. Gypsum. *See also* 514.1. Wall plasters and methods of plastering. *See also* 514.63.

514.4 LIME PLASTER

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes; 1929. Includes requirements on plastering, number of coats and their application, general quality of lime putty and sand requirements.

National Lime Assn. Proposed Specifications for Lime Plastering. Undated. Requirements on preparation, mix proportions, and application of scratch coat, brown coat, white finish coat, and sand finish coat for wood lath, for metal or wire lath, and for application to brick, tile, or concrete, recommendations on construction of backing and use of Am. Soc. for Testing Materials specifications for materials.

National Lime Assn. Proposed Specifications for Lime Stucco. Undated. Requirements on proportions and mixing of scratch coat, brown coat, and finish coat, thickness and application of various coats to wood or metal lath and to brick, tile, stone or concrete, recommendations on construction of backings, on grading and properties of fine aggregate, on A. S. T. M. specifications for materials.

References.—Definitions, methods of sampling and of testing. *See also* 500., 514.0. Sand. *See also* 512.12. Lime. *See also* 517.2. Wall plasters and methods of plastering. *See also* 514.63.

514.5 PORTLAND CEMENT PLASTER

514.6 PLASTER MANUFACTURES

514.61 Gypsum Plaster Board and Wall Board

American Society for Testing Materials. C 36–25; 1925. Gypsum Wall Board. Construction, thickness, dimensions, weight, finish, and transverse strength test requirements.

American Society for Testing Materials. Tentative Specifications. C 36–31T; 1931. Gypsum Wall Board. A tentative revision of A. S. T. M. Spec. C 36–25 changing the size of the flexural strength test specimen and corresponding test values.

American Society for Testing Materials. C 37–30; 1930. Gypsum Plaster Board. Definition, composition, thickness, dimensions, weight, finish, and transverse strength test requirements.

American Society for Testing Materials. Tentative Specifications. C 37–31T; 1931. Gypsum Lath. A revision of A. S. T. M. spec. C 37–30 changing the size of the flexural strength test specimen and the corresponding test values.

American Society for Testing Materials. Tentative Specifications. C 79–31T; 1931. Gypsum Sheathing Board. For use as a sheathing in the frame of buildings, requirements on flexural strength, dimensions, weights, and permissible variations.

Gypsum Assn. Specifications Governing Gypsum Plaster Board Construction; 1923. Uses of gypsum plaster board, requirements on dimensions and transverse strength with methods of test, on finish, on erection on wood framing, on application to metal supports, design of fire-resisting walls and partitions.

U. S. Gov., Federal Specifications Board. SS–P–431; 1931. Gypsum Plaster Board. Requirements on general construction and quality, thickness, width, length, weight, and tolerances, transverse strength, strength of bond between surface and core, for 3 thicknesses, methods of test.

U. S. Gov., Federal Specifications Board. SS–W–51; 1931. Gypsum Wall-Board. For 2 types, boards with square edges for butted joints and boards with round edges for filled joints, requirements on general quality and construction, thickness, width, length, and weight, and tolerances, transverse strength, strength of bond between surface and core, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 500., 514.0. Gypsum. *See also* 514.1. Fire tests of building materials. *See* 518.50.

514.62 Gypsum Tiles and Blocks

American Society for Testing Materials. C 52–27; 1927. Gypsum Partition Tile or Block. For use as fire protection for columns and elevator shafts, preferable face dimensions of cored or solid tile, minimum thicknesses of shell, absorption, compressive and transverse strength test requirements for block or tile, and where fire resistance is important shall meet requirements of A. S. T. M. C 19–26T.

Gypsum Assn. Gypsum Partition Tile; 1928. Specifications for Erection of Gypsum Partition Tile. Requirements on laying, anchoring, bonding, permissible heights of partitions, construction of bucks and lintels, composition of mortar, plastering, installation of conduit and trim.

References.—Definitions, methods of sampling and of testing. *See also* 500., 514.0. Gypsum. *See also* 514.1. Fire tests of building materials. *See also* 518.50.

514.63 Wall Plasters

American Society for Testing Materials. C 61–30; 1930. Keene's Cement. Comprises anhydrous calcined gypsum, the set of which is accelerated by addition of other materials. Time of setting, tensile strength, fineness, and maximum water content requirements, method of determination of chemical and physical properties.

Contracting Plasterers' International Assn. Outline Specification for Lathing and Plastering; Feb. 1931, issue of Plastering Craft. Requirements on dimensions of metal, wood, gypsum, and fibrous insulating lath, sizes of nails, requirements on lathing, furring, suspended ceiling construction, quality of materials used, preparation of lime putty, application of hard finish, scratch and brown coats, composition and application of stucco scratch coat and brown coat, minimum thickness of plaster and of grounds, rules for measurement of lathing and plastering.

References.—Definitions, methods of sampling and of testing. *See also* 500., 514.0. Gypsum plaster. *See also* 514.3. Lime plaster. *See also* 514.4.

515. MAGNESITE

516. CEMENT, CONCRETE, AND MORTAR

516.0 GENERAL ITEMS

American Assn. of State Highway Officials. Tentative Test Method. T–1. Undated. Methods of Testing Cement. Same as Am. Soc. for Testing Materials spec. C 77–30.

American Assn. of State Highway Officials. Tentative Method. T–22. Undated. Method of Making Compression Tests of Concrete. Same as C 39–27 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–23. Undated. Method of Making and Storing Compression Test Specimens of Concrete in the Field. Same as C 31–27 of Am. Soc. for Testing Materials except for thickness of plates for capping test specimens and additional provisions for capping and curing in T–23.

American Assn. of State Highway Officials. Tentative Method. T–24. Undated. Methods of Securing Specimens of Hardened Concrete from the Structure. Same as C 42–27 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–25. Undated. Method of Test for Absorption of Concrete. Requirements on drying specimen, boiling in water, and measuring absorption.

American Assn. of State Highway Officials. Tentative Method. T–26. Undated. Method of Test for Quality of Water to be Used in Concrete. Test procedure for testing for acidity, alkalinity, total solids and inorganic matter, comparison with distilled water in making concrete.

American Assn. of State Highway Officials. Tentative Method. T–35. Undated. Methods of Making Compression and Tension Tests of Fine Aggregate for Concrete. Requirements on preparation and testing of test specimens made of fine aggregate in comparison with tests made on specimens prepared from standard Ottawa sand.

American Assn. of State Highway Officials. Tentative Method. T–36. Undated. Method of Sampling Mineral Filler. Sampling the same as for Portland cement received in carload lots.

American Assn. of State Highway Officials. Tentative Method. T–37. Undated. Method for Determination of Fineness of Mineral Filler. Procedure using 200 mesh sieve and hand method of analysis.

American Assn. of State Highway Officials. Tentative Method. T–38. Undated. Method Of Proportioning Natural Sand and Gravel for Concrete Construction. Method for determining the amount of cement to make concrete equivalent to any base mixture, when the percentage of sand in the total aggregate varies from the base mixture.

American Concrete Institute. C–5A–26; 1926. Standard Methods for the Measurement of Concrete Work. Units of measurement, items to be measured, how measured, permissible allowance for holes, voids, etc. Proc. of A. C. I. for 1926, vol. 22, p. 655.

American Society for Testing Materials. Tentative Specifications. C 9–16T; 1916. Compressive Strength of Portland Cement Mortars. Requirements for compressive strength after 7 days and after 28 days for mortar composed of 1 part cement and 3 parts standard sand, recommended dimensions and design of specimen mold, preparation of specimen, dimensions of steel tamper, test procedure.

American Society for Testing Materials. C 31–31; 1931. Method of Making and Storing Specimens of Concrete in the Field. Dimensions and shape of specimens and molds, method of sampling concrete, of molding, capping, and removal of specimens from molds.

American Society for Testing Materials. C 39–27; 1927. Methods of Making Compression Tests of Concrete. Preliminary tests of materials, cement, fine and coarse aggregates, according to standard A. S. T. M. methods, dimensions and shape of concrete test specimens, flow test requirements for concrete, molding capping and curing of specimens, procedure for compressive strength tests.

American Society for Testing Materials. C 42–31; 1931. Methods of Securing Specimens of Hardened Concrete from the Structure. By use of core drill, shape and proportions of test specimen, precautions in obtaining specimen, correction factors for specimens not having standard proportions.

American Society for Testing Materials. Tentative Rules. C44–22T; 1922. Rules for Inspection of Concrete and Reinforced Concrete Work. Responsibilities and duties of inspector, rules for inspection of excavation and foundation, materials, metal reinforcement, mixing and placing concrete, forms, and removal of forms.

American Society for Testing Materials. C 77–30; 1930. Approved by American Standards Assn. as A 1b–1931. Methods of Testing Cement. Requirements on sampling, method of test for loss on ignition, insoluble residue, sulphuric anhydride, magnesia, determination of fineness, methods for mixing cement pastes and mortars, determination of consistency, soundness, time of setting, tension testing method.

American Society for Testing Materials. Tentative Test Method. C 78–30T; 1930. Method of Making Flexure Tests of Concrete, Using a Simple Beam with Center Loading. Covers methods for use in laboratory for hand mixed concrete with slight modification from methods of compression tests in A. S. T. M. Spec. C39. Requirements on preparation of materials, determination of proportions, mixing, design of test apparatus and method of test, cement and aggregates to be tested in accordance with A. S. T. M. standard methods as enumerated.

American Society for Testing Materials. Tentative Standard. C 85–31T; 1931. Method of Routine Analysis of The Cement Content of Portland Cement Concrete. Preparation of sample and test procedure.

American Society for Testing Materials. Tentative Test Method. D 138–26T; 1926. Method of Test for Consistency of Portland Cement Concrete. Covers laboratory and field methods, dimensions and construction of sheet metal frustrum of cone, test procedure for filling with concrete, removing and measuring slump.

National Engineering Inspection Assn. Tentative Methods of Procedure for Inspection of Materials; 1930. Includes general procedure such as checking of order, sampling, testing, sealing of cars, for cement; inspection of cement, inspection of forms, checking of mix of concrete, for concrete construction; materials and reinforcement according to A. S. T. M. specifications.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Cement. Sample No. 46o for normal cement and No. 47d for extra fine cement, prepared and sold by the bureau, for use in industry and by others as standards for measuring the fineness of testing sieves, etc.

516.1 CEMENT

516.11 Portland Cement

American Assn. of State Highway Officials. Tentative Standard Specifications. M–5; 1927. Portland Cement. Same as Am. Soc. for Testing Materials spec. C 9–30.

American Assn. of State Highway Officials. Tentative Standard Specifications. M–39. Undated. High Early-Strength Cement. Same as C 74–30T of Am. Soc. for Testing Materials with some additional informative notes.

American Concrete Institute. Portland Cement, Definition of. Proc. of A. C. I. for 1923, vol. 19, p. 325.

American Railway Engineering Assn. 1929 Manual. Masonry. Portland Cement; 1927. Definition, chemical test requirements for loss on ignition, insoluble residue, sulphuric anhydride, and magnesia, fineness, time of setting and tensile strength test requirements, methods of test.

American Society of Civil Engineers. Specifications and Methods of Tests for Portland Cement; 1918. Requirements as to loss on ignition, insoluble residue, sulphuric anhydride, magnesia, specific gravity, fineness, soundness under steam test, time of setting, tensile strength, methods of sampling and testing.

American Society for Testing Materials. C 9–30; 1930. Approved by American Standards Assn. as A1a–1931. Portland Cement. Test requirements for loss on ignition, insoluble residue, permissible sulphuric anhydride and magnesia, fineness, soundness, time of setting, and tensile strength, methods of test as given in C 77–30 of A. S. T. M.

American Society for Testing Materials. C 9–16T; 1916. Tentative Specifications. Compressive Strength of Portland Cement Mortars. For a one to three mixture, requirements on compressive strength of cement mortar at 7 days and at 28 days, form and molding of test piece.

American Society for Testing Materials. Tentative Specifications. C 74–30T; 1930. High Early Strength Portland Cement. Definition, requirements on permissible loss on ignition, insoluble residue, sulphuric anhydride, and magnesia, on fineness, soundness, time of setting, and tensile strength.

Asphalt Institute. Tentative Specifications. B–5; 1920. Portland Cement Concrete Base. Includes specification for Portland cement, composition, specific gravity, fineness, soundness, setting, and tensile strength requirements using A. S. T. M. methods of test.

Asphalt Institute. Tentative Specifications. C–3; 1920. Shoulders, Headers, Curbs, and Gutters. Includes specifications for Portland Cement. Composition, specific gravity, fineness, soundness, setting, and tensile strength of mortar, using A. S. T. M. standard methods of test.

U. S. Gov., Federal Specifications Board. SS–C–191; 1930. Portland Cement. Definition, requirements on permissible loss on ignition, insoluble residue, sulphuric anhydride, magnesia, required fineness, soundness, time of setting, and tensile strength of standard briquet, methods of sampling and testing.

References.—Definitions, methods of sampling and of testing. *See also* 500., 516.0.

516.12 Natural Cement

American Concrete Institute. Natural Cement, Definition of. Proc. of A. C. I. for 1923, vol. 19, p. 324.

American Society for Testing Materials. C 10–09; 1909. Natural Cement. Test requirements for fineness, soundness, time of setting, and tensile strength.

References.—Definitions, methods of sampling and of testing. *See also* 500., 516.0.

516.19 Miscellaneous Cements

American Concrete Institute. Puzzolan Cement; 1923. Definition of Puzzolan cement. See Proc. of A. C. I. for 1923, vol. 19, p. 325.

American Concrete Institute. Sand Cement, Silica Cement, Definition of. 1923. Proc. of A. C. I. for 1923, vol. 19, p. 326.

American Concrete Institute. Hydraulic Cement; 1923. Definition of hydraulic cement. *See* Proceedings of A. C. I. for 1923, vol. 19, p. 324.

U. S. Gov., Federal Specifications Board. SS–C–181; 1931. Masonry Cement. For use in making mortar for laying masonry units, requirements on fineness, time of setting, soundness, and compressive strength, methods of testing, other requirements conform to F. S. B. Spec. SS–C–191 for Portland cement.

References.—Definitions, methods of sampling and of testing. *See also* 500., 516.0.

516.2 STUCCO

American Concrete Institute. Recommended Practice. Portland Cement Stucco; 1923. Recommended materials, design of masonry and frame walls for receiving stucco, preparation and application of mortar and finish. Proc. of A. C. I. for 1923, vol. 19. p. 473.

American Concrete Institute. C–3C–29T; 1929. (Proc. A. C. I. for 1929, vol. 25, p. 561.) Finish Coat Portland Cement Stucco. Published separately by Portland Cement Assn. Requirements on compressive strength and absorption, permissible content of material passing 100 mesh sieve, general quality of coloring pigment if used, methods of making specimens and methods of test.

American Concrete Institute. Stucco, Definition of. 1923. Proc. of A. C. I. for 1923, vol. 19, p. 327.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Lathing and Plastering; 1926. Includes exterior stucco work, mix proportions of the cement mortar for the different coats, general quality requirements for aggregate and sand, methods of application and thicknesses of coats, types of finish.

Contracting Plasterers' International Assn. Outline Specification for Lathing and Plastering; Feb. 1931 issue of Plastering Craft. Stucco. Requirements on composition and application of scratch coat and of brown coat, application of stucco to masonry and concrete walls, ceilings, and columns, and to painted walls.

National Lime Assn. Proposed Specifications for Lime Stucco. Undated. Requirements on proportions and mixing of scratch coat, brown coat, and finish coat, thickness, and application of various coats to wood or metal lath and to brick, tile, stone, or concrete, recommendations on construction of backings, on grading and properties of fine aggregate, on A. S. T. M. specifications for materials.

Portland Cement Assn. Portland Cement Stucco, Condensed Specification; 1927. Cement and lime in accordance with specifications of A S. T. M., suggested requirements on general quality and screen sizes of fine aggregate, general quality of water and of coloring matter, weight, gage and mesh of metal reinforcement, proportioning and mixing, application to masonry and to frame construction.

Portland Cement Assn. Suggested Specifications for the Application of Portland Cement Stucco on Concrete Block and Tile Walls; 1928. Cement and lime according to specifications of Am. Soc. for Testing Materials, general quality of aggregate and of coloring matter, requirements on proportioning, mixing and application of scratch and brown coats, description of typical stucco finishes.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C311; 1926. Stucco Investigations at the Bureau of Standards with Recommendations for Portland Cement Stucco Construction. Includes some design requirements of building, use of white Portland cement, screen grading of fine aggregate, hydrated lime according to A. S. T. M. specifications, recommendations on mixing, placing, and general structural features of stucco construction.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10, 516.0. Cement and lime. *See also* 516.1, 517.2. Sand and fine aggregate. *See also* 512.12, 512.13.

516.3 CONCRETE AND MORTARS

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Concrete Masonry. Classification of concrete into 3 classes according to mix percentages and size of coarse aggregate, strength requirements for each class, mixing and consistency of mixture, depositing concrete above and below water, type and construction and type of expansion joints, surface finishing of concrete, placing and fastening reinforcement.

American Concrete Institute. Concrete, Definition of. Proc. of A. C. I. for 1923, vol. 19, p. 322.

American Concrete Institute. Mortar, Definition of. Proc. of A. C. I. for 1923, vol. 19, p. 324.

American Concrete Institute. Tentative Specification. 504–31T; 1931. Ready Mixed Concrete. See Proceedings of A. C. I., vol. 27, p. 1177 (May 1931 Journal of A. C. I.). Covers central plant mixed concrete and central plant-proportioned truck-mixed concrete, materials and concrete quality and proportions to be in accordance with general specifications for plain and reinforced concrete, requirements on type of mixer, time lapse between addition of cement and placing of concrete, types of transporting vehicles for various consistencies of concrete, loading of truck mixers.

American Marine Standards Committee. E No. 33–1930. Insulating Brick and Mortar. For mortar for temperatures up to 2,500° F., requirements on fineness, plastic qualities, bonding properties under heating test, nonshrinking qualities, and softening temperatures of mortar, methods of test.

American Railway Assn. Signal Section. 1111; 1911. Portland Cement Concrete. General quality of sand and permissible amount of clay or loam, general quality and maximum size of crushed stone or gravel, construction of forms, mixing, placing, and finishing concrete, placing of reinforcement.

American Railway Engineering Assn. 1929 Manual. Masonry. Portland Cement Concrete, Plain and Reinforced; 1929. Cement and reinforcement steel according to A. R. E. A. specifications, general quality and grading requirements for fine aggregate and for coarse aggregate of crushed stone, gravel or slag, organic impurity test for sand according to A. S. T. M. methods, sizes of reinforcement bars, proportioning and mixing requirements, rules for placing and handling concrete, depositing under water, construction of forms, placing reinforcement, proportions for concrete in sea water and alkali soils, surface finish.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes; 1929. Mortars. Mortar for brickwork, mortar for stone masonry, mortar for sewers, mortar for clay hollow tile, mortar for architectural terra cotta, and mortar for concrete and architectural stone, requirements on general quality of cement and sand, mixing and proportions of ingredients.

American Society of Municipal Engineers. Sewers; 1927. Mortar, for brick or segmental block masonry, and mortar for pipe joints. Requirements on mix proportions and general quality of materials.

American Society of Municipal Engineers. Sewers; 1927. Concrete. Definition, requirements on mix proportions for 4 classes of concrete, procedure for mixing by machine and for mixing by hand, consistency, and preparation in freezing weather, for use in construction of sewers.

American Society for Testing Materials. Tentative Specifications. C 80–31T; 1931. Curing Portland Cement Concrete. Required strength standard for various methods of curing, requirements on temperatures and protection for cold weather curing, use of A. S. T. M. test methods specified.

American Society for Testing Materials. Tentative Specifications. C 81–31T; 1931. Curing Portland Cement Concrete Slabs with Bituminous Coverings. Requirements on consistency of bituminous material, procedure for curing using wet burlap coverings followed by spraying concrete with bituminous material after removal of burlap.

American Society for Testing Materials. Tentative Specifications. C 82–31T; 1931. Curing Portland Cement Concrete Slabs with Calcium Chloride Admixture. Calcium chloride according to A. S. T. M. Spec. D 98–30T, requirements on preparation of solution and addition to mix, finishing concrete and use of wet burlap covering.

American Society for Testing Materials. Tentative Specifications. C 83–31T; 1931. Curing Portland Cement Concrete Slabs by Surface Application of Calcium Chloride. Calcium chloride according to A. S. T. M. Spec. D 98–30T, procedure of covering with burlap, removing, and applying specified amount of calcium chloride.

American Society for Testing Materials. Tentative Specifications. C 84–31T; 1931. Curing Portland Cement Concrete Slabs with Wet Coverings. Requirements on covering of concrete with burlap followed by ponding or covering with wet earth or straw, time periods for each type of covering.

Associated Tile Manufacturers. Publ. K300. Basic Specification for Tile Work; 1924. Concrete and Mortar. Requirements on mix proportions of concrete and of mortar, general quality of materials, screen grading of sand.

Cast Stone Institute. Architectural Specification for Cast Stone; 1930. Includes specifications for Portland cement mortar for setting of cast stone, requirements on mix proportions of cement, lime, and sand, screening of lime, preparation of mortar.

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Concrete Reinforcing Steel Institute. Reinforced Concrete, Handbook; 1928. Includes standard customs, sizes of bars, standard uses of spacers and supports, bundling and tagging, standard design formulas. Includes specifications of reinforced concrete in structures, requirements for concrete mix, general quality and grading of sand and crushed stone or gravel, construction of forms, placing and spacing of reinforcement, placing concrete.

Gypsum Assn. Gypsum Partition Tile; 1928. Specifications for Erection of Gypsum Partition Tile. Includes mortar for gypsum tile construction, requirements on mix proportions of gypsum plaster and sand.

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Portland Cement Assn. Plain and Reinforced Concrete, Specification Manual; 1924. Typical specification forms for use by architects and engineers with materials and methods of test according to specifications of A. S. T. M., includes general requirements on excavation, backfilling, construction of forms, construction of joints, placing reinforcement, proportioning, mixing and placing concrete for various types of concrete construction.

U. S. Gov., Dept. of Commerce. Bureau of Standards. BH6; 1924. Recommended Minimum Requirements for Masonry Wall Construction. For special cement-lime mortar for use in walls of hollow unit construction, requirements on proportion of Portland cement, lime, and sand, recommended by Building Code Committee for incorporation in building codes.

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U. S. Gov., Federal Specifications Board. SS–W–101; 1931. Integral Waterproofing Material. For material intended for mixing with Portland cement mortar or concrete for waterproofing, permissible absorption and permeability of mortar, required strength as compared to mortar without waterproofing, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10, 516.0. Method of test for refractories. *See also* 534.10. Gravel, sand, fine aggregate, coarse aggregate. broken stone, slag. *See also* 512.11, 512.12, 512.13, 512.14, 512.15, 512.2. Cement and lime. *See also* 516.1, 517.2. Concrete brick, block, cast stone. *See also* 516.4. Concrete sidewalks, poles and posts. *See also* 516.5, 516.9. Concrete road construction. *See also* 518.21, 518.31. Concrete bridges and piling. *See also* 518.4. Concrete in building construction. *See also* 518.5. Concrete drain structures and pipe. *See also* 518.6. Concrete for tanks and masonry. *See also* 518.7, 518.8.

516.4 CONCRETE BRICKS AND BLOCKS

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Concrete Cribbing. Requirements on proportions for concrete are the same as for precast bearing piles, material and minimum size of drift bolts, nonallowance of depressions, spalls, patched surfaces, and other defects, construction of cribbing, and layer method of placing filling.

American Concrete Institute. P–1A–29; 1929. Concrete Building Block and Concrete Building Tile. Strength and absorption requirements and methods of testing. Proc. of A. C. I. for 1927, vol. 23, p. 696, as amended in Proc. for 1928, vol. 24, p. 834.

American Concrete Institute. P3–A–29T; 1929. (Proc. A. C. I. for 1929, vol. 25, p. 550.) Published separately by Portland Cement Assn. Tentative Specifications for Cast Stone. Definition, requirements on compressive strength and absorption at age of 28 days, selection of specimens and methods of testing.

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American Concrete Institute. Proposed Recommended Practice for the Manufacture of Concrete Building Block and Tile. Proceedings of A. C. I., vol. 27, p. 1001 (April 1931 Journal). Proposed by committee with a view to superseding spec. P 6–A–25T. Recommendations on plant layout, curing room construction for various types of curing systems, general quality of materials, consistency of concrete, mixing, manufacture, and curing of blocks and tile.

American Concrete Institute. Tentative Specification. P–1B–26T; 1926. Concrete Brick. Strength and absorption requirements and methods of test. Proc. of A. C. I. for 1925, vol. 21, p. 604 as amended on p. 667 of vol. 22 of 1926.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes. Concrete Architectural Stone; 1926. Cement according to A. R. E. A. specifications, compressive strength and water absorption limit requirements, type of finish and general requirements on use in building construction.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Concrete Roofing Tile; 1926. For 2 sizes and for interlocking and flat types in large sizes, cement according to A. R. E. A. specifications, types of and addition of colorings, method of manufacture, permissible weight and variations in dimensions, water absorption limits and load bearing requirements, method of laying.

American Society for Testing Materials. Tentative Specifications. C 55–28T; 1928. Concrete Building Brick. General quality, compressive strength and modulus of rupture requirements when tested according to A. S. T. M. method C 67, dimensions of standard brick and permissible variations. Covers 2 grades dependent on strength.

Cast Stone Institute. Tentative Standard Specification for Cast Stone. Undated. Definition, requirements on compressive strength and absorption, methods for testing.

Portland Cement Assn. Recommended Building Ordinance for Concrete Block and Tile; 1928. Cement in accordance with specifications of A. S. T. M., requirements on strength and absorption limits for block and tile.

Underwriters' Laboratories (Inc.). Hollow Concrete Building Units; 1930. For units with a rating of R3 hours under standard fire tests, requirements on compressive strength, dimensions, thickness of webs, design, permissible silicious material in aggregate used, permissible combustible material in cinders used for aggregate, weight of Haydite aggregate, proportioning of concrete, curing.

U. S. Gov., Dept. of Commerce. Bureau of Standards. BH.1; 1923. Recommended Minimum Requirements for Small Dwelling Construction. For hollow concrete block, recommendations of building code committee on requirements for compressive strength and permissible absorption for blocks used in exterior or party walls.

U. S. Gov., Dept. of Commerce. Bureau of Standards. BH6; 1924. Recommended Minimum Requirements for Masonry Wall Construction. For concrete block or concrete tile, requirements for compressive strength, permissible absorption, recommended by building code committee for incorporation in building codes.

U. S. Gov., Dept. of Commerce. Bureau of Standards. BH6; 1924. Recommended Minimum Requirements for Masonry Wall Construction. For concrete brick, recommendations of building code committee on requirements for compressive strength and permissible absorption.

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U. S. Gov., Federal Specifications Board. SS–C–621; 1931. Hollow Masonry Concrete Units. Units for wall construction, load bearing type and nonload bearing type, requirements on compressive strength, moisture in units at time of delivery, and absorption allowed for load bearing type, methods of test.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10, 516.0. Methods of sampling and testing clay brick and fire clay brick. *See* 534.10. Gravel, sand, fine aggregate, coarse aggregate, broken stone, slag. *See also* 512.11, 512.12, 512.13, 512.14, 512.15, 512.2. Cement. *See also* 516.1. Concrete brick and blocks in building construction. *See also* 518.5.

516.5 CONCRETE SIDEWALKS AND DRIVEWAYS

American Concrete Institute. C–2B–25; 1925. Portland Cement Concrete Sidewalks. Specifications for materials, construction, measuring and mixing, and curing, specification for 1 and 2 course construction. Proc. of A. C. I. for 1925, vol. 21, p. 591.

American Society of Municipal Engineers. Sidewalks and Curbs; 1927. General quality, size range of fine aggregate, tensile test requirements for fine aggregate mortar, general quality and size ranges of coarse aggregate, mixing, placing, and reinforcement for 2-course and for 1-course sidewalks.

Portland Cement Assn. Concrete Sidewalks; 1930. For 1-course sidewalks and for 2-course sidewalks, suggested requirements on material, quality, and screen grading of fine aggregate and coarse aggregate, cement according to A. S. T. M. specification C9, thickness of joint fillers and of metal division plates, mix proportions of concrete, thickness of course, placing and finishing, provision of joints.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10, 516.0. Gravel, sand, fine aggregate, coarse aggregate, broken stone, slag. *See also* 512.11, 512.12, 512.13, 512.14, 512.15, 512.2. Cement. *See also* 516.1.

516.9 MISCELLANEOUS SPECIFICATIONS FOR CEMENT AND CONCRETE

American Electric Railway Engr. Assn. Recommended Specification. D108–26; 1926. Specification For The Manufacture of Reinforced Concrete Poles. Materials, methods of manufacture, and curing.

American Railway Assn. Electrical Section. XVIII–b–21; 1921. Stone Conduits. Requirements on screen grading of limestone screenings, mix proportions with Portland cement, standard dimensions, joint construction, mandrel test, water absorption test, hammer test for cracks, installation rules.

American Railway Assn. Signal Section. 11622; 1922. Cement Concrete Battery Box. Dimensions of box, size, type and placing of reinforcement, general quality of sand and stone or gravel, size of stone or gravel, mixing proportions and consistency of concrete, construction of cover of wood covered with sheet iron, painting, test requirements for strength and leakage of box, and for humus content of sand.

American Railway Assn. Signal Section. 12429; 1929. Concrete Trunking and Capping. For protection of insulated signal wire, size and type of reinforcement steel, cement according to A. R. A. specifications, permissible clay in sand, size of stone or gravel, mixing proportions, placing concrete, dimensions of forms, curing.

American Railway Assn. Telegraph and Telephone Section. 1–A–8; 1925. Reinforced Concrete Poles. General quality requirements of sand, water, and gravel, range in size of gravel or stone, type of reinforcement rods and their elastic limit, requirements on placing of reinforcement and construction of poles, curing, strength test requirements, standard dimensions of round poles.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Railway Buildings, Sec. 21. Brick Pavements and Floors. For cement grout filler, requirements on general quality and screen grading of sand, cement in accordance with A. R. E. A. specifications for Portland cement.

American Railway Engineering Assn. 1929 Manual. Concrete Fence Posts; 1923. Cement according to A. R. E. A. specifications, material, general quality, range of sizes, test for organic matter, for fine and coarse aggregate, and bank gravel, type of reinforcement, mixing, consistency and strength requirements for the concrete, manufacturing and curing concrete posts.

Joint Concrete Culvert Pipe Committee. Tentative Standard Specifications for Reinforced Concrete Culvert Pipe; 1928. (Am. Concrete Inst., A. S. T. M., U. S. Dept. Agri., Am. Soc. Civil Engineers, Am. Assn. State Highway Off., Am. Rwy. Engr. Assn., Am. Concrete Pipe Assn.) For standard and extra strength pipe, cement and steel in accordance with A. S. T. M. specifications, requirements on general quality and freedom from injurious amounts of organic and unsuitable material for fine and coarse aggregate, screen grading of fine aggregate, methods of design, permissible working stresses, standard sizes of pipe, placing reinforcement, strength tests and strength requirements.

Portland Cement Assn. Suggested Specifications for Concrete in Petroleum Refineries; 1927. Cement according to A. S. T. M. specifications, requirements on material, general quality, and screen grading of fine aggregate and of coarse aggregate, quality of water, placing of reinforcement, water-cement ratio, mixing and placing concrete.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10, 516.0. Gravel, sand, fine aggregate, coarse aggregate, broken stone, slag *See also* 512.11, 512.12, 512.13, 512.14, 512.15, 512.2. Cement. *See also* 516.1. Concrete in road construction. *See also* 518.21, 518.31. Concrete in bridge and building construction. *See also* items under 518.4, 518.5. Concrete drainage structures and pipe. *See also* 518.6. Concrete tanks and masonry. *See also* 518.7, 518.8. Concrete burial vaults. *See* 959.3.

517. LIME

517.0 GENERAL ITEMS

American Society for Testing Materials. C 50–27; 1927. Methods of Sampling, Inspection, Packing, and Marking of Quicklime and Lime Products. Methods of sampling of lump or granular material and of powdered material in bulk or in packages, packing and marking of lump, pulverized and hydrated lime.

American Society for Testing Materials. C 51–28; 1928. Definitions of Terms Relating to Lime.

517.1 LIME

References.—Lime, quicklime, and hydrated lime. *See* 517.2.

517.2 HYDRATED LIME AND QUICKLIME

American Ceramic Society. Journal of A. C. S. for June, 1928. U. S. Bureau of Standards Cir. 118. Adopted by A. C. S. in 1924. Limestone, Quicklime, and Hydrated Lime. Use of lime in manufacture of glass, definitions, requirements on chemical composition of nonvolatile portion of limestone, quicklime or hydrated lime, fineness, methods of sampling and testing.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Quicklime to be Used in Water Treatment; 1922. For high calcium and calcium classes and for selected and run-of-kiln grades, sampling and chemical composition requirements.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Hydrated Lime to be Used in Water Treatment; 1922. For high calcium and calcium classes, sampling, chemical composition, and fineness requirements.

American Society for Testing Materials. C 5–26; 1926. Quicklime for Structural Purposes. For calcium lime and for magnesium lime, limiting percentage requirements for calcium and magnesium oxides, for silica, alumina, oxide of iron, and for carbon dioxide, percentage of residue from slaking test, chemical tests according to A. S. T. M. C 25–27T.

American Society for Testing Materials. C 6–31; 1931. Hydrated Lime for Structural Purposes. Covers masons' hydrate for plaster, stucco and mortar; and finishing hydrate for finish plaster coat, test requirements for percentages of carbon dioxide and oxides of calcium and magnesia, for fineness, soundness, and for finishing grade plasticity test requirements.

American Society for Testing Materials. C 25–29; 1929. Methods of Chemical Analysis of Limestone, Quicklime and Hydrated Lime. Treatment of sample, determination of silica and insoluble matter, of total iron, aluminum, calcium, strontium, magnesium, volatile matter, mechanical moisture, carbon dioxide, sulphuric anhydride, sulphur, phosphorus, manganese, ferrous iron, available lime, procedure of test.

American Society for Testing Materials. C 46–27; 1927. Quicklime for Use in the Manufacture of Sulphite Pulp. Limiting percentages of calcium and magnesium oxides, and of oxides of silicon, aluminum, and iron, chemical analysis according to A. S. T. M. C 25–27T.

American Society for Testing Materials. C 47–27; 1927. Hydrated Lime for the Manufacture of Varnish. General quality requirements, test requirements for fineness and for tung oil heat test, requirements on percentages of oxides of calcium, magnesium, and iron, and of insoluble matter, chemical analysis according to A. S. T. M. C 25–27T.

American Society for Testing Materials. C 45–25; 1925. Quicklime and Hydrated Lime for Use in the Cooking of Rags for the Manufacture of Paper. General quality, requirements for percentages of available lime, methods of analysis according to A. S. T. M. C 25–27T.

American Society for Testing Materials. C 48–24; 1924. Quicklime and Hydrated Lime for Use in the Textile Industry. General quality requirements, requirements on percentages of oxides of calcium, magnesium, iron, aluminum, percentages of carbon dioxide and insoluble matter, chemical analysis according to A. S. T. M C 25–27T.

American Society for Testing Materials. C 49–24; 1924. Quicklime and Hydrated Lime for the Manufacture of Silica Brick. Requirements on percentages of oxides of calcium, magnesium, iron, and aluminum, of silica and insoluble matter, and of carbon dioxide, using A. S. T. M. method of test C 25–27T.

American Society for Testing Materials. C 53–27; 1927. Quicklime for Use in Water Treatment. General quality requirements, required percentage of available lime using A. S. T. M. test method C 25–27T. For treatment of public water supplies.

American Society for Testing Materials. C 54–27; 1927. Hydrated Lime for Use in Water Treatment. For use in treatment of public water supplies, required percentage of available lime using A. S. T. M. test method C 25–27T.

American Water Works Assn. Water Works Practice Manual; 1925. Chemicals Used in Water Purification. Lime. Standard content of available calcium oxide for quick lime and for hydrated lime.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C373; 1928. Quicklime for Use in the

Distillation of Ammonia from Ammonia Liquors Obtained in Coke and Gas Manufacture. Approved by Interdepartmental Conference on Chemical Lime and the Nat'l Lime Assn. Requirements on fineness and available calcium oxide, methods of sampling and testing.

U. S. Gov., Dept. of Commerce. Bureau of Standards C372; 1929. Quicklime and Hydrated Lime for Use in Soap Making. Approved by Interdepartmental Conference on Chemical Lime and the Nat'l Lime Assn. Requirements on available lime in quicklime and available calcium hydroxide in hydrated lime, permissible magnesia and insoluble matter, methods of sampling and test.

U. S. Gov., Dept. of Commerce. Bureau of Standards C231; 1925. Quicklime and Hydrated Lime for Use in the Purification of Water. Approved by the Interdepartmental Conference on Chemical Lime. Requirements on percentage of available lime in quicklime and of available calcium hydroxide in hydrated lime, methods of sampling and testing.

U. S. Gov., Dept. of Commerce. Bureau of Standards C207; 1925. Limestone, Quicklime, Lime Powder, and Hydrated Lime for Use in the Manufacture of Sugar. Approved by Interdepartmental Conference on Chemical Lime, Nat'l Lime Assn., and Hawaiian Sugar Planters Assn. Requirements on percentage of sugar soluble lime, permissible magnesia and loss on ignition, screen grading requirements of powder and hydrated lime, methods of sampling and testing.

U. S. Gov., Dept. of Commerce. Bureau of Standards C203; 1925. Quicklime and Hydrated Lime for Use in the Manufacture of Calcium Arsenate. Approved by Interdepartmental Conference on Chemical Lime and the Nat'l Lime Assn. Requirements on available lime and permissible magnesia, methods of sampling and testing.

U. S. Gov., Dept. of Commerce. Bureau of Standards C189; 1924. Quicklime and Hydrated Lime for Use in the Absorption of Carbon Dioxide. Approved by Interdepartmental Conference on Chemical Lime, the Nat'l Lime Assn., and Bureau of Aeronautics of Navy Dept. Requirements on percentage of available lime, permissible carbon dioxide, fineness, and methods of sampling and testing.

U. S. Gov., Dept. of Commerce. Bureau of Standards C150; 1923. Quicklime and Hydrated Lime for Use in the Manufacture of Sand-Lime Brick. Approved by Interdepartmental Conference and Nat'l Lime Assn. Requirements on general quality, chemical composition and purity, methods of sampling and test.

U. S. Gov., Dept. of Commerce. Bureau of Standards C144; 1923. Limestone and Quicklime for Use in the Manufacture of Sulphite Pulp. Approved by Interdepartmental Conference, Nat'l Lime Assn., and Tech. Assn. of Pulp and Paper Assn. Requirements on chemical composition of high calcium stone and lime and of high magnesium stone and lime, methods of sampling and testing.

U. S. Gov., Dept. of Commerce. Bureau of Standards C143; 1923. Recommended Specification for Quicklime for Use in Causticizing. Approved by Tech. Assn. of Pulp and Paper Assn. representing the largest users. Requirements on available lime, permissible magnesia, methods of sampling and testing.

U. S. Gov., Federal Specifications Board. SS–L–351; 1930. Hydrated Lime for Structural Purposes. For masons type and for finishing type, requirements on content of calcium and magnesium oxides and of carbon dioxide, fineness, soundness, and plasticity, methods of sampling and test.

U. S. Gov., Federal Specifications Board. SS–Q–351; 1930. Quicklime for Structural Purposes. For calcium type and for magnesium type, requirements on content of calcium and magnesium oxides, permissible silicon, aluminum, and iron oxides, carbon dioxide, and waste, methods of sampling and test.

U. S. Pharmacopœial Convention (Inc.). Pharmacopœia of U. S. A.; 1926. Lime, and Chlorinated Lime. For medicinal purposes, descriptions and physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

References.—Definitions, method of sampling and of testing. *See also* 500., 517.0. Lime for fertilizer. *See* 859. Lime whitewash. *See* 843.5.

518. CONSTRUCTION WORK

518.0 GENERAL ITEMS

American Society for Testing Materials. D 220–29; 1929. Method of Test for the Determination of Moisture Equivalent of Sub-Grade Soils in the Field. Treatment of sample, test procedure for determining water absorption qualities of subgrade soil for road work.

518.1 GRADING FOR ROADS

518.10 General Items

American Electric Railway Engineering Assn. W201–15; 1915. Classification and Bearing Power of Soils. Mechanical analysis of soils into fine gravel, sands, silt, and clay, with sizes of screens used in making of analysis, data on bearing power. Same as given in U. S. Dept. of Agriculture Bull. No. 82.

American Railway Engineering Assn. 1929 Manual. Grade Crossings. Highway grade crossings and approaches other than those for which requirements are stipulated by law; 1923. Grading requirements, width of embankments and surfacing of highway.

518.11 Roadway Preparation

American Society of Municipal Engineers. Street Railway Track; 1923. Requirements on excavation, subsurface and surface drainage, construction and general quality of ballast for plain ballast construction and for concrete slab subballast, solid concrete construction, concrete according to A. S. M. E. specifications, rails and rail joints according to A. S. T. M. and A. E. R. E. A. specifications, kinds of wood and dimensions of ties.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Includes clearing of roadway, requirements on clearing and grubbing of trees and shrubs, removal of stumps and roots from roadway proper, permissible use of timber cut in construction of road, piling timber, piling and burning brush.

References.—Definitions, methods of sampling and of testing. *See also* 518.0, 518.10.

518.12 Excavation and Embankment

American Society for Testing Materials. D 220–29; 1929. Method of Test for the Determination of Moisture Equivalent of Subgrade Soils in the Field. Treatment of sample, test procedure for determining water absorption qualities of subgrade soil for road work.

Asphalt Institute. Tentative Specification. C–1; 1920. Preparation of Subgrade. Requirements on clearing and grubbing, roadway excavation, construction of embankments, installation of under drainage, grading and rolling.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929.

Hand-Laid Rock Embankment. Requirements on general quality and minimum volume of stones, excavation of footing and construction of footing and embankment.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. For roadway and drainage excavation and embankment construction, requirements on classification of excavation, construction of side ditches, use and disposal of material excavated, method of measurement, layer method of constructing embankment, tamping around structures, etc.

References.—Definitions, methods of sampling and of testing. *See also* 518.0, 518.10.

518.13 Slopes and Shoulders for Roads

Asphalt Institute. Tentative Specifications. C–3; 1920. Shoulders, Headers, Curbs, and Gutters. General quality and screen grading requirements and construction of gravel shoulders. General quality and screen grading requirements and construction of broken stone, mine tailings or slag shoulders.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. For shoulders, requirements on methods of construction.

References.—Definitions, methods of sampling and of testing. *See also* 518.0, 518.10. Gravel, broken stone, slag for shoulders. *See also* 512.11, 512.15, 512.2.

518.14 Subbases for Roads

Asphalt Institute. Tentative Specifications. C–2; 1920. Subbase. General quality and maximum size of approved stone, mine tailings, slag, or gravel aggregate, placing of material and construction of subbase.

References.—Definitions, methods of sampling and of testing. *See also* 518.0, 518.10. Other specifications for subbases and fonndations. *See also* 518.2. Gravel, broken stone, slag. *See also* 512.11, 512.15, 512.2.

518.2 FOUNDATION FOR ROADS

518.20 General Items

American Electric Railway Engineering Assn. W102–23; 1923. Recommended Design of Proper Foundation for Tracks in Paved Streets. Drawing showing recommended design of track foundation, with dimensions and mix proportions of concrete.

U. S. Gov. Federal Specifications Board. SS–M–51; 1931. Materials for Cushion Course for Brick, Stone Block, or Wood Block Pavement. For sand, granulated slag, slag screenings, or limestone screenings, requirements on screen grading, permissible silt, loam, clay, etc., using test methods of Am. Soc. for Testing Materials.

518.21 Cement Concrete Foundation for Roads

American Society for Testing Materials. D 58–24; 1924. Materials for Cement Mortar Bed for Brick, Stone Blocks, Wood Block, Asphalt Block, and Other Block Pavements. General quality and grading of sand, strength test requirements for mortar made from sand, cement according to A. S. T. M. specifications for Portland cement.

Asphalt Institute. Tentative Specifications. B–3; 1920. Reconstruction of Old Macadam to Serve as Base Course. For construction of base course over old road, general quality, wear, and screen grading requirements for coarse aggregate and screenings of broken stone, mine tailings, or slag, using A. S. T. M. standard methods of test, depth and construction of one course base.

Asphalt Institute. Tentative Specifications. B–5; 1920. Portland Cement Concrete Base. General quality, wear, and screen grading requirements for broken stone, mine tailings, slag, or gravel, general quality and grading requirements for sand and stone screenings, composition and physical requirements for Portland cement, tests according to A. S. T. M. methods, mixing concrete, depth, construction of base.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10, 516.0, 518.0, 518.10. Street railway foundation. *See* 518.20. Sand, gravel, broken stone, slag. *See also* 512.1, 512.2. Cement and concrete. *See also* 516.1, 516.3. Preparation of roadway. *See also* 518.11, 518.12.

518.22 Telford Foundation for Roads

American Assn. of State Highway Officials. Tentative Standard Specifications. M–1; 1924. Stone for Telford Base Course and Reconstructed Base Course. Requirements on general quality of stone and of approximate dimensions of pieces.

Asphalt Institute. Tentative Specifications. B–4; 1920. Telford Base. General quality requirements for stones, approximate dimensions of large stones, placing of stones and construction of base.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. For subbase of telford stone, requirements on depth and method of laying and ramming, filling of voids, rolling or tamping.

References.—Definitions, methods of sampling and of testing. *See also* 510. Preparation of roadway. *See also* 518.11, 518.12.

518.23 Macadam Foundation for Roads

American Society of Municipal Engineers. Asphaltic Concrete; 1916. Includes new macadam foundation for asphaltic concrete pavement, grade sizes of stone, construction of foundation.

Asphalt Institute. Tentative Specifications B–2; 1920. Macadam Base. General quality, wear, and screen grading requirements for coarse aggregate and screenings of broken stone, mine tailings, or slag, using A. S. T. M. standard methods of test, for 2 course base, depths of courses and construction of base.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10. Sand, gravel, and broken stone. *See also* 512.1. Slag. *See also* 512.2. Slag foundation. *See also* 518.28. Bituminous macadam foundation. *See also* 518.25. Asphaltic foundation. *See also* 518.27. Broken stone foundation. *See also* 518.24. Ballast. *See also* 511.73. Preparation of roadway. *See also* 518.11, 518.12.

518.24 Broken Stone Foundation for Roads

American Society of Municipal Engineers. Subgrades and Foundations for Pavements; 1928. For broken stone foundations, preparation of subgrade, grade sizes of broken stone, construction of new macadam and making use of old macadam foundation.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. For subbase of crushed rock, permissible largest dimension of material, method of construction by layers and maximum depth of layer, amount of filler and method of application and rolling.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10. Broken stone. *See also* 512.15. Ballast. *See also* 511.73. Telford foundation. *See also* 518.22. Macadam foundation. *See also* 518.23. Bituminous macadam foundation. *See also* 518.25. Asphaltic foundation. See also 518.27. Preparation of roadway. *See also* 518.11, 518.12.

518.25 Bituminous Macadam Foundation for Roads

American Society of Municipal Engineers. Subgrade and Foundations for Pavements; 1928. Includes tar-bound base, cold penetration type, sizes of broken stone, construction of base course, waterproof course, and of sand cushion, physical and chemical requirements for refined tar for base course and sand cushion.

References.—Other bituminous (asphalt) macadam base courses. *See also* 518.27. Definitions, methods of sampling and of testing of bituminous materials. *See also* 502.2, 505.0, 505.30. Definitions, methods of sampling and of testing of nonbituminous materials. *See also* 500., 510., 512.10. Sand, gravel, broken stone. *See also* 512.1. Slag. *See also* 512.2. Asphalts, road oils, tar. *See also* 505.1, 505.2, 505.3. Preparation of roadway. *See also* 518.11, 518.12. Bituminous concrete foundation. *See also* 518.26.

518.26 Bituminous Concrete Foundation for Roads

American Society of Municipal Engineers. Subgrades and Foundations for Pavements; 1928. Includes tar-bound base, hot penetration type, construction of subgrade, grade sizes of broken stone, temperature of applied tar, construction of various courses and sand cushion of pavement, physical and chemical requirements for refined tar.

References.—Other bituminous (asphalt) concrete foundations. *See also* 518.27. Definitions, methods of sampling, and of testing bituminous materials. *See also* 502.2, 505.0, 505.30. Definitions, methods of sampling and of testing nonbituminous materials. *See also* 500., 510., 512.10. Bituminous macadam foundation. *See also* 518.25. Sand, gravel, and broken stone. *See also* 512.1. Slag. *See also* 512.2. Asphalts, road oils, tar. *See also* 505.1, 505.2, 505.3. Preparation of roadway. *See also* 518.11, 518.12.

518.27 Asphaltic Foundation for Roads

American Society of Municipal Engineers. Subgrades and Foundations for Pavements; 1928. Includes asphaltic base, general quality of broken stone, slag, mine tailings, or gravel, wear per cent for broken stone or slag, and screen grading of coarse aggregate, grading requirements for sand, physical and chemical requirements for asphalt cement, preparation of ingredients and construction of pavement.

Asphalt Institute. B–7; 1929. Asphalt Macadam Base. (Penetration Method.) General quality, wear, and screen grading requirements for broken stone, mine tailings or slag, general quality of asphalt cement, tests in accordance with A. S. T. M. standard methods, depth of courses and construction of 2 course base.

Asphalt Institute. B–8; 1929. Asphaltic Concrete Base. (Black Base.) General quality, wear, and screen grading requirements for broken stone, mine tailings, slag or gravel, general quality and grading requirements for sand, general quality of asphalt cement, test methods in accordance with A. S. T. M. standard methods, preparation of mixture, depth and construction of base.

References.—Other asphaltic (bituminous) foundations. *See also* 518.25, 518.26. Definitions, methods of sampling and of testing bituminous materials. *See also* 502.2, 505.0. Definitions, methods of sampling and of testing nonbituminous materials. *See also* 500., 510., 512.10. Sand, gravel, broken stone. *See also* 512.1. Slag. *See also* 512.2. Asphalt, road oils. *See also* 505.1, 505.2. Preparation of roadway. *See also* 518.11, 518.12.

518.28 Slag Foundation for Roads

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. For subbase of slag, permissible largest dimensions of material, method of construction by layers and maximum depth of layer, amount of filler and method of application and rolling.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10. Slag. *See also* 512.2. Preparation of roadway. *See also* 518.11, 518.12.

518.29 Miscellaneous Specifications for Foundations for Roads

Asphalt Institute. Tentative Specifications. B–1; 1920. Gravel Base. General quality, and screen grading requirements for gravel in accordance with A. S. T. M. methods of test D 18, depth of courses and construction of two course base.

Asphalt Institute. Tentative Specifications. B–6; 1920. Truing Up Old Pavements to Serve as Base Course. Materials according to Asphalt Assn. specifications for sheet asphalt surface course, asphaltic concrete surface course, or asphalt macadam surface course, mixing and construction, using above materials for filling.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. For subbase of knapped field or quarry stone, or gravel, permissible largest dimension of material, method of construction by layers and maximum depth of layer, amount of filler and method of application and rolling.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10, 518.0, 518.10. Rock and stone. *See also* 511.7. Sand, gravel, and broken stone. *See also* 512.1. Slag. *See also* 512.2. Preparation of roadway. *See also* 518.11, 518.12.

518.3 PAVEMENT SURFACES

518.30 General Items

American Assn. of State Highway Officials. Standards of Practice for General Road Design; 1929. Requirements on number of traffic lanes for various densities of traffic, maximum degree of curvature, location of points of change of direction, superelevation of curves, required sight distances on curves, width of subways, etc.

518.31 Cement Concrete Pavements

American Concrete Institute. S–6A–28; 1928. Portland Cement Concrete Pavements. One Course Pavement for Highways. Specifications for materials, subgrade, forms, joints, mixing, placing concrete and reinforcement, and curing. Proc. of A. C. I. for 1924, vol. 20, p. 695 with amendment in vol. 24, p. 852; 1928.

American Concrete Institute. S–6B–28; 1928. Portland Cement Concrete Pavements. Two Course Pavement for Highways. Specifications for materials, subgrade, forms, joints, mixing and placing, reinforcement, curing. Proc. of A. C. I. for 1924, vol. 20, p. 710 with amendment in vol. 24, p. 852; 1928.

American Concrete Institute S–6C–28; 1928. Portland Cement Concrete Pavements. One Course Street Pavement. Specifications for materials, subgrade, street structures, forms, joints, mixing and placing, finishing and curing. Proc. of A. C. I. for 1924, vol. 20, p. 716 with amendment in vol. 24, p. 852; 1928.

American Concrete Institute. S–6D–28; 1928. Portland Cement Concrete Pavements. Two Course Street Pavement. Specifications for materials, subgrade, street structures, forms, joints, mixing and placing, finishing and curing. Proc. of A. C. I. for 1924, vol. 20, p. 724 with amendment in vol. 24, p. 852; 1928.

American Electric Railway Engr. Assn. Recommended Specification. W113–28; 1928. Prepared jointly with Am. Soc. of Municipal Engineers Street Railway Track Construction. For track in paved city streets, recommendations on excavation and subgrade, subsoil and surface drainage, plain ballast and concrete slab subballast construction, rails, rail joints, bonds, rail fastenings, ties, pavement base, rail filler, and pavement types.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Concrete Pavements and Foundations; 1929. Pavement of subgrade and one course of concrete, preparation of subgrade, general requirements on construction of forms, layout of expansion and longitudinal joints, placing of reinforcement and concrete, finishing, and curing.

American Society of Civil Engineers. Committee Report. Materials for Road Construction and Standards for Their Test and Use; 1918. Includes cement concrete pavements, recommendations on rates of road grade, crown, artificial foundation, thickness of slab, cement tested according to A. S. C. E. committee recommendation on Uniform Test for Cement, construction of pavement, methods of test.

American Society of Municipal Engineers. Portland Cement Concrete Pavements; 1926. Minimum size and spacing of reinforcement, recommendations on design, cement and aggregates according to A. S. T. M. specifications, composition of asphalt grout and mastic, penetration, flash point, ductility, and other requirements for asphalt for mastic, absorption, brittleness, and distortion test requirements for joint filler, compressive strength of concrete, minimum thickness of pavement, requirements for mixing and placing of concrete and for construction of pavement.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10. 516.0. Sand, gravel, broken stone, slag. *See also* 512.1, 512.2. Concrete. *See also* 516.3. Grading for roadway. *See also* 518.1. Foundations for roads. *See also* 518.2. Concrete sidewalks. *See also* 516.5. Curbs and gutters. *See* 518.63. 518.64. General road design. *See also* 518.30. Road building equipment, weighing equipment. *See* 743., 793.5.

518.32 Gravel Pavements

American Society of Civil Engineers. Committee Report. Materials for Road Construction and Standards for Their Test and Use; 1918. Includes gravel roads, recommendations on rates of road grade, crown, artificial foundation, includes two classes of materials, screened and unscreened, recommendations on sizes as adopted by American Society of Municipal Engineers in 1916, methods of test.

American Society of Municipal Engineers. Proposed Specifications; 1922. Broken Stone and Gravel Roads With and Without Bituminous Surface Treatment. For gravel roads, construction of subgrade, composition and grading requirements for two mixtures of gravel, sand and clay, cementation test requirement using A. S. C. E. methods, construction of three course road.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Surface Courses. Two course crushed rock or crushed gravel, one course crushed rock or crushed gravel, and 2 course gravel surface courses. Requirements on general quality and screen grade sizes of material in each course and binder, percentage of binder, methods of construction and rolling.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10. Gravel, sand. *See also* 512.11, 512.12. Grading for roadways. *See* 518.1. Foundations of roads. *See also* 518.2. Curbs and gutters. *See also* 518.63, 518.64. Road building equipment. *See* 743.

518.33 Macadam Pavements

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Macadam Pavements; 1929. Grading and subgrade same as for concrete pavements, general quality of stone, thickness, size of broken stone, and method of construction of foundation course, second course, and surface course, minimum weight of roller.

American Society of Civil Engineers. Committee Report. Materials for Road Construction and Standards for Their Test and Use; 1918. Includes broken stone roads, recommendations on rates of road grade, crown, artificial foundation, recommended abrasion test requirements, maximum screen sizes of stone, construction, methods of test.

American Society of Municipal Engineers. Asphalt Macadam Pavement; 1927. General quality, per cent of wear number, weight and grading requirements for coarse, intermediate, and fine grades of aggregate of broken stone, mine tailings or slag; penetration, ductility, volatility, flash point, and solubility of asphalt cement, using A. S. T. M. methods of test, construction of pavement.

American Society of Municipal Engineers. Proposed Specifications; 1922. Broken Stone and Gravel Roads With and Without Bituminous Surface Treatment. For stone roads, general quality, coefficient of wear, toughness, and screen grading requirements for broken stone, number of and construction of courses, physical and chemical requirements for refined tars and asphaltic oils for surface treatments, requirements for treating of road surface with hot bituminous materials or with cold bituminous materials.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Surface Courses. Two course crushed rock or crushed gravel, one course of crushed rock or crushed gravel, and 2 course gravel surface courses. Requirements on general quality and screen grade sizes of material in each course and binder, percentage of binder, methods of construction and rolling.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10. Sand, gravel broken stone, slag. *See also* 512.1, 512.2. Bituminous macadam pavements. *See olso* 518.34, 518.37. Grading for roadway. *See also* 518.1. Foundations and base courses. *See also* 518.2. Curbs and gutters. *See* 518.63, 518.64. General road design. *See also* 518.30. Road building equipment. *See* 743.

518.34 Bituminous Macadam and Bituminous Concrete Pavements

American Society of Civil Engineers. Committee Report. Materials for Road Construction and Standards for Their Test and Use; 1918. Includes bituminous macadam pavements, recommendations on rates of road grade, crown, artificial foundation, recommended abrasion test requirements, maximum screen size of stone, construction of road and application of bituminous material, methods of test.

American Society of Civil Engineers. Committee Report. Materials for Road Construction and Standards for Their Test and Use; 1918. Includes bituminous concrete pavements, recommendations on rates of road grade, crown, artificial foundation, three classes of pavement dependent on aggregate used, recommended abrasion test and screening test requirements for broken stone, recommended practice on heating, mixing, and laying, methods of test.

American Society of Municipal Engineers. Asphaltic Concrete; 1916. (Bituminous Concrete Pavement.) For tar concrete pavement, requirements on construction of foundation, quality, and mesh composition of mineral aggregate, methods of mixing and laying, surface finishing. physical and chemical requirements for coal tar cement and water-gas tar cement.

References.—Other bituminous (asphalt) pavement. *See also* 518.37. Definitions, methods of sampling and of testing for bituminous materials. *See also* 502.2, 505.0, 505.30. Definitions, methods of sampling and of testing for nonbituminous materials. *See also* 500., 510., 512.10. Sand, gravel, broken stone, slag. *See also* 512.1, 512.2. Asphalts, road oils, tar. *See also* 505.1, 505.2, 505.3. Grading for roadways. *See also* 518.1. Foundations and base courses. *See also* 518.2.

Curbs and gutters. *See* 518.63, 518.64. Mineral filler. *See also* 512.16. General road design. *See also* 518.30. Road building equipment. *See* 743.

518.35 Brick Pavements

American Assn. of State Highway Officials. Bituminous Filled Brick Pavements; 1929. For vitrified brick on concrete base, requirements for grading of sand or granulated slag for bedding course, oil asphalt for filling joints according to A. A. S. H. O. specifications 18 or 19, method of preparation of bedding course and laying brick, rolling brick, heating and applying filler.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Railway Buildings, Sec. 21. Brick Pavements and Floors. For brick pavements, requirements on quality and size of brick, quality and screen grading of cushion sand, composition of grout and of bituminous fillers, construction of foundation, laying of cushion, laying paving brick, tamping and rolling, application of fillers.

American Society of Civil Engineers. Committee Report. Materials for Road Construction and Standards for Their Test and Use; 1918. Includes brick pavements, recommendations on rates of road grades, crown, artificial foundation, joints, construction of sand cushion and pavement, method of making rattler test.

American Society of Municipal Engineers. Vitrified Brick Pavements; 1930. Requirements on general quality, types, dimensions, and testing of brick, quality of sand and construction and thickness of sand or cement sand bed for pavement, specifications for asphalt filler, laying of brick, rolling, and construction of pavement.

References.—Definitions, methods of sampling and of testing. *See also* 500., 512.10, 534.10. Sand-lime brick. *See also* 513. Clay brick. *See also* 534.11. Cushioning materials. *See also* 512.12, 512.2, 518.20. Sand filler, mineral fillers. *See also* 512.12, 512.16. Cement grout filler. *See also* 516.9. Bituminous fillers. *See also* 505.15. Grading for roadway. *See also* 518.1. Foundations for roads. *See also* 518.2. Curbs and gutters. *See also* 518.63, 518.64. General road design. *See also* 518.30. Road building equipment. *See* 743.

518.36 Stone Block Pavements

American Society of Civil Engineers. Committee Report. Materials for Road Construction and Standards for Their Test and Use; 1918. Includes stone block pavements, recommendations on maximum road grade, crown, artificial foundations, on percentage of wear, toughness, crushing strength, and dimensions of granite and sandstone blocks, construction of foundation, cushion, and pavement, methods of test.

American Society of Municipal Engineers. Stone Block Pavements; 1927. Size and dressing of blocks, French coefficient and toughness requirements for new and resurfacing granite blocks, general quality, size and dressing of sandstone and durax blocks, mixture for cement-sand bed, requirements for bituminous filler, construction of pavement.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10. Stone block. *See also* 511.71. Mineral filler, grout filler. *See also* 512.16, 516.9. Bituminous fillers. *See also* 505.15. Cushioning materials. *See also* 512.12, 512.2, 518.20. Preparation of roadway. *See also* 518.1. Foundations for roads. *See also* 518.2. Curbs and gutters. *See* 518.63, 518.64. General road design. *See also* 518.30. Road building equipment. *See* 743.

518.37 Asphalt Pavements

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Asphalt Paving Blocks. For the asphaltic cement, requirements on freedom from water, specific gravity, flash point, penetration, volatility, ductility, and bitumen soluble in carbon tetrachloride; types of stone, percentage of wear, and screen grading of mineral aggregate; fineness of inorganic dust; manufacture and dimensions of blocks, specific gravity, and absorption test requirements.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Asphalt Macadam Pavements; 1929. Grading and subgrade same as for concrete pavement specifications, general quality of stone, asphaltic cement according to A. S. T. M. specifications, minimum weight of roller, thickness, size of broken stone, and method of construction of foundation course, second course, top surface.

American Railway Engineering Assn. 1929 Manual. Bituminous Crossings; 1926. Construction of pavement at crossings, preparation of roadbed, number, thickness, mix proportions of courses, tamping or rolling and general construction requirements, for use of emulsified asphalt, rock asphalt, and cut-back products.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Asphalt Block Pavements; 1929. Subgrade according to A. R. E. A. specifications for concrete pavement, dimensions of blocks, pressure and temperature used in manufacture, making of mortar bed, laying blocks, construction of asphalt, sand, or grout joints, surfacing.

American Society of Civil Engineers. Committee Report. Materials for Road Construction and Standards for Their Test and Use; 1918. Includes sheet asphalt pavements, recommendations on maximum road grade, crown, artificial foundation, thickness of wearing course, grading of binder aggregate, of sand, and of dust filler, percentage of bitumen, hot mixing recommendations and construction of road. methods of test.

American Society of Civil Engineers. Committee Report. Materials for Road Construction and Standards for Their Test and Use; 1918. Includes asphalt block pavements, recommendations on road grade to which applicable, crown, artificial foundation, construction of road, material for making of block, grading of material, specific gravity, absorption, and dimensions of blocks, recommended test methods.

American Society of Municipal Engineers. Sheet Asphalt Paving; 1927. General quality and screen size requirements for stone for binder course, for sand for binder and for surface courses, and of mineral filler, penetration, ductility, volatility, and flash point requirements for asphalt cement, type of equipment and operation, mixing proportions, construction of pavement.

American Society of Municipal Engineers. Fine Aggregate Asphaltic Concrete Paving; 1927. General quality, percentage of wear, and mesh composition of broken stone aggregate, general quality, and mesh composition of fine aggregate and of chip stone seal coat, penetration, ductility, volatility, flash point, and solubility of asphalt cement, preparation and composition of asphaltic concrete mixture, construction of pavement, test methods according to A. S. T. M. specifications.

American Society of Municipal Engineers. Asphaltic Concrete (Bituminous Concrete Pavement); 1916. For asphaltic concrete pavement, requirements on construction of foundation, quality and mesh composition of mineral aggregate, methods of mixing and laying, surface finishing, asphalt to be in conformity with requirements in specifications for sheet asphalt pavement of A. S. M. E. Preparation of materials and construction of bitulithic pavement.

Asphalt Institute. A-1; 1929. Asphalt Macadam Surface Course. Percentage of wear and grading requirements for coarse, intermediate and fine aggregate of broken stone, mine tailings or slag, weight of slag, quality and penetration requirements for asphalt cement, tests according to A. S. T. M. methods, depth of course, construction, filling voids, seal coat, etc.

Asphalt Institute. A–2; 1929. Asphaltic Concrete Surface Course. (Coarse Graded Aggregate Type.) General quality, wear and screen grading requirements for coarse and intermediate aggregates of broken stone, mine tailings, slag, or approved gravel, general quality and screen grading of sand and of limestone dust filler, tests according to A. S. T. M. methods, depth and construction of course.

Asphalt Institute. A–3; 1929. Asphaltic Concrete Surface Course. (Fine Graded Aggregate Type.) General quality and screen grading requirements for broken stone, slag, or mine tailings and for sand and limestone dust, quality of asphalt cement, tests according to A. S. T. M. methods, preparation of mixture, construction of and depth of course.

Asphalt Institute. A–4; 1929. Sheet Asphalt Binder and Surface Courses. General quality, wear, and screen grading requirements for broken stone, quality and grading requirements for sand for binder and surface courses, general quality of asphalt cement, tests according to A. S. T. M. methods, preparation of mixture, depths of courses and construction.

Asphalt Institute. A–5; 1929. Asphaltic Concrete Binder and Surface Courses. General quality, wear, and screen grading requirements for broken stone or slag, general quality and grading requirements for sand or broken stone or slag for wearing course, quality of asphalt cement, tests according to A. S. T. M. methods, preparation of mixtures, depth and construction of courses.

References.—Other asphaltic (bituminous) pavements. *See also* 518.34. Definitions, methods of sampling and of testing asphaltic materials. *See also* 502.2, 505.0. Definitions, methods of sampling and of testing nonbituminous materials. *See also* 500., 510., 512.10. Sand, gravel, broken stone, slag. *See also* 512.1, 512.2. Asphalts, road oils. *See also* 505.1, 505.2. Mineral filler. *See also* 512.16. Grading for roadway. *See also* 518.1. Foundations and base courses. *See also* 518.2. Curbs and gutters. *See* 518.63, 518.64. Road design. *See also* 518.30. Road building equipment. *See* 743.

518.38 Sand Clay or Top-Soil Pavements

American Society of Civil Engineers. Committee Report. Materials for Road Construction and Standards for Their Test and Use; 1918. Includes earth and sand clay roads, recommendations on rates of road grade, crown, artificial foundation, construction of earth roads, mixture percentages for sand-clay road material, construction of sand-clay roads on different types of subsoil.

National Lime Assn. Lime Treatment of Earth Roads. Undated. For clay or silt loam roads, requirements on preparation of road surface, amount of lime to apply, applying and working in of the hydrated lime.

U. S. Gov., Federal Specifications Board. 452; 1927. Materials for Top-Soil or Sand-Clay Road Surfaces. For material made up of sand, silt, clay, and gravel, free from excess of mica and feldspar, divided into 3 grades for traffic of 400 vehicles per day and less, requirements on screen grading and mechanical analysis, using Am. Soc. for Testing Materials methods.

References.—Definitions, methods of sampling and of testing. *See also* 500., 510., 512.10. Sand. *See also* 512.11. Grading for roadways. *See also* 518.1. Foundations for roads. *See also* 518.2. Grading of soils. *See also* 594. Road building equipment. *See* 743.

518.39 Miscellaneous Pavements Specifications

References.—Wood blocks and wood block pavements. *See also* 402.3.

518.4 BRIDGE CONSTRUCTION

518.41 Bridges

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Includes some specifications and references to other specifications for materials, general construction as regards excavation and fill, sheet piling, bearing piles, concrete masonry, reinforcement, ashlar masonry, rubble masonry, brick masonry, rip-rap, waterproofing, design features, loads, unit stresses, concrete design, etc.

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Reinforced Concrete Slab and Girder Bridges. Requirements on type and mix proportions of concrete, placing concrete, design of drainage, camber, and surface finish.

American Electric Railway Engr. Assn. Misc. Methods and Practices. B209–26; 1926. Design of Small Bridges, Culverts and Trestles. Shows maximum recommended sizes of pipe and drawings of typical designs of concrete box culverts, concrete arch culverts, I beam spans on concrete abutments, frame and pile trestles.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Concrete. Includes concrete bridges, requirements on mix proportions for various parts of bridge structure, on screen grading, color test, and mortar strength test for fine aggregate of sand, general quality, screen grading, per cent of wear of coarse aggregate of broken stone, gravel, or slag, methods of construction, placing of reinforcement, materials not otherwise specified to be in accordance with A. S. T. M. and Fed. Spec. Bd. and other standard specifications.

References—Stone. *See also* 511. Sand, gravel, broken stone, slag. *See also* 512. Cement. *See also* 516.1. Concrete and mortars. *See also* 516.3. Cast stone, concrete cribbing, concrete blocks. *See also* 516.4. Steel reinforcement. *See also* 605.25. Wooden bridges. *See* 412.2. Steel bridges. *See* 605.21. Asphalts. *See also* 505.1. Tar and pitch. *See also* 505.3. Riprap. *See also* 511.72. Rubble and ashlar masonry. *See also* 518.81, 518.82. Brick masonry. *See also* 518.83. Masonry arches. *See also* 518.46, 518.84.

518.42 Piling

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Concrete Piles. For precast piles, requirements on percentage of reinforcement, spacing of reinforcement, type of reinforcement, form work and casting procedure, grade of concrete. For cast-in-place piles, requirements on rigidity of metal form, type and placing of reinforcement, placing of concrete, grade of concrete.

American Railway Engineering Assn. 1929 Manual. Masonry. Premolded Concrete Piles; 1927. Size range of aggregate, strength requirements and curing, rules for driving.

National Board of Fire Underwriters. Building Code; 1931. Includes concrete piles used in building construction, requirements on minimum shell thickness and diameter of pile for steel tubes filled with concrete; for premolded piles, requirements on amount and location of reinforcement, diameter or lateral dimension for various lengths; for cast-in-place piles, requirements on dimensions; requirements on size of broken stone or gravel and mix proportions for concrete, permissible bearing loads for the various types.

Simplex Concrete Pile Assn. (Inc.). Standard Simplex Concrete Piles. Undated. Describes method of making cast-in-place piles by driving in form, filling with concrete, and removing form, requirements on shape of steel form, material of detachable driving base.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Concrete Piles. Requirements on general quality and screen grading of sand and of coarse aggregate, on minimum average and minimum point diameters, relation of length to diameter, placement of reinforcement and construction of precast piles, curing requirements.

References.—Sand, gravel, broken stone. *See also* 512.1. Cement. *See also* 516.1. Concrete and mortars. *See also* 516.3. Steel reinforcement. *See also* 605.25. Wooden piling. *See* 401.4.

518.43 Parapets and Railings

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Railings and Parapets. Requirements on material and construction of concrete railing, and of pipe railings.

References.—Sand, gravel, broken stone. *See also* 512.1. Cement. *See also* 516.1. Concrete and mortars. *See also* 516.3. Steel reinforcement. *See also* 605.25. Cast iron pipe for railings. *See also* 607.13. Other iron and steel pipe. *See* 607.2, 607.3, 607.4. Masonry bridges. *See* 518.41. Wooden railing lumber. *See* 402.2.

518.44 Bridge Slabs and Girders

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Reinforced Concrete Slab and Girder Bridges. Requirements on type and mix proportions of concrete, placing concrete, design of drainage, camber, and surface finish.

References.—Sand, gravel, broken stone. *See also* 512.1. Cement. *See also,* 516.1. Concrete and mortars. *See also* 516.3. Steel reinforcement. *See also* 605.25. Masonry bridges. *See also* 518.41.

518.45 Concrete Floors for Bridges

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Bituminous Carpets. For tar carpets on bridge floors, first coat using tar according to spec. M–24 of A. A. S. H. O. with specific viscosity from 8 to 13 and second coat according to spec. M–25. For asphalt carpet using either Spec. M–21 or M–23 for asphalt cement of A. A. S. H. O. with special requirements on specific gravity and penetration.

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Bridge Floors. Requirements on mix proportions of concrete, placing of reinforcement and concrete, expansion joints, drainage, surface finish, and curing.

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Wearing Surfaces for Bridge Floors. For concrete wearing surface, requirements on additional thickness of floor for monolithic construction, thickness of concrete for separate wearing surface construction, mix proportions of concrete. For brick wearing surface, requirements on preparation of subfloor, proportions and placing of sand-cement bedding course, laying and rolling the brick, applying asphalt filler, surface dressing. For asphalt block wearing surface, requirements on preparation of subfloor, proportions and placing of mortar bed, laying blocks. For bituminous carpets, requirements on quality and size of fine aggregate, preparation of wood and of concrete subfloors, construction of tar mat and of asphalt mat surface. For creosoted wood block wearing surface, requirements on preparation of subfloor, laying the blocks, application of filler. Materials according to A. A. S. H. O. specifications.

References.—Sand, gravel, broken stone, slag. *See also* 512. Cement, concrete. *See also* 516.1, 516.3. Steel reinforcement. *See also* 605.25. Brick. *See also* 534.11. Paving surfaces. *See also* 518.3.

518.46 Bridge Arches

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Arches. Requirements on centering of ribs, waterproofing, drainage, and filling. For concrete arches, requirements on type and mix of concrete, placing of concrete, construction of expansion joints, finish of surface. Ashlar masonry and rubble masonry arches, requirements on general quality and size of stone, construction of arch ring, material and construction of backing.

References.—Sand, gravel, broken stone, slag. *See also* 512. Cement and concrete. *See also* 516.1, 516.3. Steel reinforcement. See also 605.25. Other masonry arches. *See* 518.84. Rubble and ashlar masonry. *See also* 518.81, 518.82.

518.5 BUILDING CONSTRUCTION AND MATERIALS

References.—Steel buildings and metal parts of buildings. *See* 605.22.

518.50 General Items

American Concrete Institute. Proposed Recommended Practice for the Use of Pigment Admixtures in Troweled Concrete Surfaces. Proceedings of A. C. I., vol. 27, p. 275 (April 1931 Journal). For the pigment, requirements on insolubility, purity, fastness to light, heat, alkalies, and weak acids, fineness, permissible calcium sulphate and moisture, methods of test; for colored concrete, requirements on proportioning and mixing of pigments, cement, and aggregates, quality and size of aggregates, quality of water, placing and finishing for various types of construction.

American Concrete Institute. No. 506–31T; 1931. Tentative Construction Specifications for Concrete Work on the Small Job. (Journal of A. C. I. for Sept., 1930, as amended in May, 1931, Journal.) Cement and steel in accordance with A. S. T. M. specifications, requirements on sieve analysis and fineness modulus of fine and of coarse aggregates, construction and design of formwork, measurement and proportioning of batch for concrete of various strengths, mixing and placing of concrete, etc.

American Concrete Institute. No. 503–31T; 1931. (Proc. of A. C. I. for 1930, vol. 26, p. 444.) Tentative specifications for Supplying, Fabricating, and Setting Reinforcing Steel on Ordinary Buildings. Material in accordance with A. S. T. M. specifications, requirements on extension of bars into supports, relative width of stirrups. lap of column bars, length of spiral reinforcement in column and its relative diameter, etc.

American Concrete Institute. No. 502–31T; 1931. (Proc. of A. C. I. for 1930, vol. 26, p. 1 as amended in vol. 27, p. 99.) Tentative Construction Specifications for Concrete Work on Ordinary Buildings. Cement in accordance with A. S. T. M. specifications, requirements on general quality, fineness, modulus and screen grading of fine aggregate and of coarse aggregate, construction of formwork, measurement and proportioning of batch, placing concrete, etc.

American Concrete Institute. Recommended Practice in Use of Cast Stone; 1930. (Proc. of A. C. I. for 1930, vol. 26, p. 760.) Requirements on manufacture, compressive strength, permissible absorption, classification according to finish, depth to reinforcement, structural requirements for the cast stone and of cast stone in building construction.

American Concrete Institute. Tentative Recommended Practice. C–2B–25T; 1925. Treatment of Exterior Surfaces of Industrial Reinforced Concrete Buildings. Minimum requirements for pointing and patching, correction of column and beam lines, cement washes, paints, rubbed and tooled finishes. Proc. of A. C. I. for 1925, vol. 21, p. 564.

American Concrete Institute. Tentative Regulations. E–1A–28T; 1928. Building Regulations for Reinforced Concrete. Intended as a supplement to a building code, they give allowable working stress, mixing and placing of concrete, construction of forms, design rules for buildings and parts. Proc. of A. C. I. for 1928, vol. 24, p. 791.

American Institute of Architects. Document No. 172; 1927. A filing System for Architects' Offices. Includes a standard classification of construction materials with numbers assigned to headings and subheadings, primarily for filing of advertising matter.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes; 1929. General construction requirements for excavation, filling, sewers and drainage, concrete and masonry work of various types, roofs, sheet metal work, structural steel and iron, millwork, painting, plastering, hardware, plumbing, heating, electrical work, floors and pavements, etc.

American Society for Testing Materials. Tentative Specifications. C 19–26T; 1926. Approved as tentative by American Standards Assn. under designation A 2–1926. U. S. Bureau of Standards and A. S. A. Fire Protection Group joint sponsors with A. S. T. M. Fire Tests of Building Construction and Materials. For determining performance during exposure to fire and not for suitability for use after exposure, standard time temperature curve for regulation of fire test, fire endurance test requirements and fire stream test where specified for floors, roofs, walls, columns and partitions.

Associated Tile Manufacturers. K–300; 1924. Tilework. Basic specifications for installation of tilework, including requirements for size of aggregate, mixing of concrete, mortar, metal lath, shrinkage mesh, building paper, mortar setting beds, setting of tiles, scratch coats for vertical surfaces, and special applications.

Common Brick Mfrs. Assn. of America. Suggested Specifications for Brickwork; 1930. For building construction, includes requirements on bricklaying, such as wetting of brick, bonding, construction, and thickness of joints, construction at intersection of walls, facing and back-up, setting of door frames, waterproofing, connecting with existing work, cement and lime in accordance with A. S. T. M. specifications, etc.

Concrete Reinforcing Steel Institute. Reinforced Concrete, Handbook; 1928. Includes standard customs, sizes of bars, standard uses of spacers and supports, bundling and tagging, standard design formulas. Includes specifications of reinforced concrete in structures, requirements for concrete mix, general quality and grading of sand and crushed stone or gravel, construction of forms, placing and spacing of reinforcement, placing concrete.

Concrete Reinforcing Steel Institute. Handbook of Reinforced Concrete Building Design; 1928. Includes Tentative Building Regulations for Reinforced Concrete. Prepared as a part of a general building code by American Concrete Institute and Concrete Reinforcing Steel Institute. See American Concrete Institute Specification E–1A–28T for description of scope.

National Assn. of Sheet Metal Contractors. Standard Practice in Sheet Metal Work; 1929. Drawings and brief descriptions of standard construction for sheet metal roofing, gutters, conductors, flashings, corrugated iron work, skylights, ventilators, metal cornices, metal ceilings, warm air furnaces, heating and ventilating systems, blow pipe and exhaust systems, fire door and kalamein doors, hollow metal doors and trim, hollow metal windows, restaurant, kitchen, and hotel equipment, protective coatings and paints, 356 drawings of standard sheet metal practice and typical designs.

National Board of Fire Underwriters. Building Code; 1931. Recommended for municipalities, requirements on height and area restrictions, location of building, light and ventilation, number, types, and location of exits, required loadings for design and permissible working stresses for materials, construction requirements for concrete, masonry, steel and iron, and wood, wall thicknesses, safeguards during construction, fireproof construction and semi-fireproof construction, installation of heat appliances and forced draft systems, regulations for theatres, garages, elevators, electrical equipment, and fire extinguishing equipment.

National Board of Fire Underwriters. Nitro-Cellulose Motion Picture Film, Production, Storage and Handling; 1931. Requirements on construction of buildings and partitions, capacity and construction of storage cabinets; for film vaults, construction, protection of openings, construction of racks, type of lighting fixture, vents; for buildings and vaults, provision of and requirements for automatic sprinkler systems, allowable types and construction of heating, lighting, and motor equipment, rules for handling film.

National Board of Fire Underwriters. Photographic and X-Ray Nitrocellulose Films; 1930. Storage and handling of unexposed film and of film negatives, venting, division, materials, construction, and automatic sprinkler requirements for storage cabinets and storage vaults, maximum area to be covered by one sprinkler, heating and lighting requirements, maximum permitted size of cabinet or vault.

National Board of Fire Underwriters. Suggested Ordinance Providing Safeguards Against Fire Hazards During the Construction of Buildings; 1929. Covers requirements on type of construction for scaffolds, hoists, hoisting machinery, as regards fire resistance, provision of passenger elevators, temporary stairways, fireproofing, standpipes, etc., dependent on height of structure.

National Board of Fire Underwriters. Storage and Sale of Pyroxylin Plastic; 1922. Regulations on provision of sprinklers for storage rooms, spacing of displays, sizes of containers, precautions on lights, heat, means of egress, ventilation and storage requirements.

National Board of Fire Underwriters. Pyroxylin Plastic, Storage, Handling, and Use in Factories; 1928. Definitions, permissible height and construction of factory buildings, material and construction of partitions, requirements on types and installation of heating and drying equipment and lights, water supply requirements for automatic sprinklers, provision of fire pails and auxiliary hose; for isolated storage buildings, requirements on construction, capacity, venting, and distance from other buildings; for factory, requirements on storage of raw materials, their transportation, arrangement of tables and apparatus, precautions in manufacture.

National Board of Fire Underwriters. Protection of Openings in Walls and Partitions against Fire; 1930. Number and minimum size of wall openings, type of door required, construction of sills, wall openings, lintels, and wall frames, installation of various types of doors and shutters, conditions to which applicable, ease of mounting, ruggedness, relative resistance to fire and fire stream, size, operation and maintenance, includes applicability of various sliding, swinging, vertical, rolling, normally closed, and automatic doors, tin clad, solid steel, sheet metal, and hollow metal doors, tin clad, solid steel, and sheet metal shutters, swinging, sliding and rolling shutters, and glass fire windows, for protection of openings in division walls, enclosures to vertical openings, partitions, and exterior walls.

National Board of Fire Underwriters. Electric Railway Car Houses and Cars; 1925. Wiring of electric car houses and auxiliary buildings operated by electric traction companies, support and protection of trolley wires and third rail, enclosing of control apparatus in cabinets, sizes of fuses, construction of car houses, dimensions of walls, fireproofing materials, construction of skylights, pits, tracks, chimneys, maintenance and fire protection requirements for both inside and outside.

National Board of Fire Underwriters. Hose Houses for Mill Yards; 1926. Size, construction, material, and illustrated designs for frame hose houses, construction of hose shelves, hardware, fire equipment, lengths and size of hose provided.

Structural Clay Tile Assn. Structural Clay Building Tile as Recommended for Building Code and Engineering Practice; 1930. Requirements on general quality, strength, and absorption for hard, medium, and soft tile, minimum dry weights, installation, grade of tile, and permissible working stress for tile exterior and bearing walls, allowable heights of non-bearing walls, floor and roof arch-construction with thickness and strength requirements for tile and minimum depth of arch, fireproofing requirements.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R87–29; 1929. Sizes of Removable and Permanent Forms, Pans, or Domes Made of Wood, Steel, or Other Material Used in Concrete Ribbed Floor Construction. Simplified practice recommended and accepted by industry establishing a limited number of standard stock sizes for forms, standard widths and depths.

U. S. Gov., Dept. of Commerce. Bureau of Standards LC 71; 1922. Tentative Classification of Building Construction with Reference to Fire Resistance. Building construction is divided into 7 grades with subclasses according to ability to resist exposure to fire or prevent the spread of fire, type of material permitted in exterior and fire walls, in partitions, doors, floors, interior trim, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards BH 7; 1924. Minimum Live Loads Allowable for Use in Design of Buildings. Recommended by building code committee for adoption in State and Municipal building codes, covers live loads due to human occupancy, industrial or commercial occupancy, roof loads, movable partition loads, and wind pressures.

U. S. Gov., Dept. of Commerce. Bureau of Standards BH8; 1925. Recommended Practice for Arrangement of Building Code. Standard form and arrangement of a building code, recommended by building code committee for adoption by code-making bodies.

U. S. Gov., Dept. of Commerce. Bureau of Standards BH9; 1926. Recommended Building Code Requirements for Working Stresses in Building Materials. Requirements on working stresses in reinforced concrete, cast iron, structural steel shapes, and wood members, recommended by building code committee for adoption by code making bodies.

References.—Sand, gravel, broken stone, slag. *See also* 512. Cement, concrete. *See also* 516.1, 516.3. Brick, building tile, roofing tile, terra cotta, glazed tile, mosaic. *See also* 534. Sand lime brick. *See also* 513. Granite, limestone, marble, sandstone. *See also* 511. Gypsum tiles and blocks. *See also* 514.62. Brick masonry. *See also* 518.83. Rubble and ashlar masonry. *See also* 518.81, 518.82. Steel reinforcement. *See also* 605.25. Wooden lath. *See also* 402.51. Metal lath. *See also* 605.24. Wooden shingles. *See* 402.52. Asphalt roofing, tar roofing. *See also* 505.16, 505.36. Yard lumber. *See* 402.4, 411. Slate roofing. *See also* 511.52. Structural timbers. *See also* 412. Millwork. *See also* 423. Plaster. *See also* 514. Drains and sewers. *See also* 518.6. Steel buildings and metal parts of buildings. *See also* 605.22. Eaves troughs and conductor pipe. *See also* 607.5. Industrial building construction for prevention of dust explosions. *See* 782, 789.

518.51 Buildings and Dwellings

American Assn. of Medical Milk Commissions. Methods and Standards for Production of Certified Milk; 1931. Includes construction of dairy building and milking stables from sanitary viewpoint.

American Electric Railway Engr. Assn. Recommended rules. B102–25; 1925. Regulations for construction, maintenance and protection of car houses. Specifications for height of buildings, thickness of walls, fireproof construction, and regulations on heating, lighting, housekeeping, and fire protection equipment.

American Electric Railway Engineering Assn. Recommended Rules. B104–30; 1930. Regulations for Construction and Operation of Bus Garages. Requirements on building heights and floor areas between fire walls, structural features in conformity with Building Code of National Board of Fire Underwriters, requirements on openings in walls, enclosure of vertical openings, lighting, heating, ventilation, fire protection.

American Electric Railway Engr. Assn. Misc. methods and practices. B206–23; 1923. Design of oil houses and their equipment for property of 100 to 150 cars. Recommendations on construction, selection of equipment, and drawings of suggested arrangements of building and equipment, construction for decreasing fire hazard.

American Railway Assn. Purchases and Stores Div. Stores Department Buildings and Facilities for Handling Material; 1929. Report of committee recommending standards as regards location of buildings, maximum dimensions, fire resistive construction, number of stories, level of floor, provision of platforms, structural features, etc., for store houses, paint and oil store houses, garages, lumber sheds, oxygen-acetylene houses, etc.

Associated Factory Mutual Fire Insurance Companies. Gravity Water Tanks and Steel Towers. vol. 1. Structural Details; 1930. For buildings supporting tanks, requirements as to footings on brick supporting walls, design of anchorage, allowable bearing pressures for supports of various building materials. Concrete buildings according to A. S. T. M. specifications for concrete.

Common Brick Manufacturers' Assn. of Am. Brick House. Undated. Specifications for the brickwork in a dwelling including requirements for composition of mortar, laying of brick, thickness of walls and construction of chimneys and fireplaces, construction and design of ideal type brick wall.

National Board of Fire Underwriters. Storage and Handling of Combustible Fibers; 1925. Covers standard fiber warehouse of fire resistive construction for baled cotton, sisal, jute, hemp, oakum, kapok, excelsior, etc. Dimensions, construction of solid masonry walls of brick, stone, or concrete, roof covering, protection of roof and wall openings, doors, construction of floors, fire extinguishing equipment, requirements for heating, power, and electric light equipment, storage methods and quantities, housekeeping.

National Board of Fire Underwriters. Dwelling Houses; 1920. A code of suggestions for the construction and fire protection of dwelling houses recommended by N. B. F. U., covers defective construction and its relation to fire hazard, quality of materials suitable for construction, construction of walls, floor, roof, chimneys, heating and lighting equipment, fire stopping, frame and concrete construction.

National Board of Fire Underwriters. Code of Suggested Ordinances for Small Municipalities; 1928. Includes requirements for private and public garages, requirements on construction and fire test resistance of floor, ceiling, and walls, capacity and location of gasoline storage tanks, etc.

National Board of Fire Underwriters. Code of Suggested Ordinances for Small Municipalities; 1928. Includes requirements for the construction and equipment of buildings in small towns and villages, requirements on construction of skylights, shafts, number of exits, roof openings, fire stops, height of frame buildings, chimneys, installation of hot air pipes, steam pipes, stoves and furnaces.

National Building Granite Quarries Assn. (Inc.). Architectural Granite. Undated. Includes specifications for granite work, general requirements on quality of granite, submitting of samples for judging quality, texture and color, requirements on degree of finish, quality of finish and cutting, construction of beds and joints, bonding, provision of washes and drips, etc., carving, setting, precautions against stain, pointing and cleaning, etc.

National Fire Protection Assn. Approved by American Standards Assn. as A 9–1929. Building Exits Code. Requirements on width, construction, materials, design, arrangement, inclosure, etc., for stairs, horizontal exits, doors, slide escapes, elevators and escalators in accordance with American Standards Assn. Codes, installation of lighting and alarm systems, etc.

National Fire Protection Assn. Protection of Records; 1928. Includes Record Rooms, requirements on dimensions, materials, thickness and construction of walls, fire resistance ratings of walls, floors, ceilings, metal and vault type doors, construction of doors and windows, installation of filing equipment, lighting, heating, ventilating.

National Fire Protection Assn. Building Construction, Standard Industrial Buildings; 1929. For buildings over one story, includes slow-burning heavy timber construction, permissible height and floor area, number of exits, materials and stresses according to quoted specifications, requirements on construction and protection of roof and wall openings and shaft enclosures, on framing methods, on wall thicknesses, electrical and fire protection equipment, etc.

National Fire Protection Assn. Building Construction, Standard Industrial Buildings; 1929. For buildings over one story, including Reinforced Concrete Construction, permissible height and floor area, number of exits, materials and stresses according to quoted specifications, requirements on construction and protection of roof and wall openings and shaft enclosures, on construction of walls, columns, floor, roof, on drainage, electrical and fire protection equipment, etc.

National Terra Cotta Society. Terra Cotta Standard Construction; 1927. Book of 67 drawing plates illustrating standard construction for entrances, bays, door openings, arched openings, balcony construction, balustrades, wall copings, cornices, store front piers, niches, windows, dormers, columns, domes, towers, spires, gargoyles, methods of support, details of anchors, hangers, straps, the drawings are to scale and contain main dimensions.

Portland Cement Assn. Recommended Building Ordinance for Concrete Block and Tile; 1928. Cement in accordance with specifications of A. S. T. M., requirements on strength and absorption limits for block and tile, materials and mix proportions of mortar, lateral support, thickness and height of walls, permissible working stresses, and bonding, for various types of wall construction.

Portland Cement Assn. Specifications for Small Store Buildings. For monolithic concrete and concrete masonry construction, recommended requirements on proportioning of concrete, mixing and placing concrete, mortar mix for concrete block and tile construction, finishing of floors and exterior walls, cast-in-place ornamental trim, application of stucco, materials according to cited specifications of various organizations.

Railway Fire Protection Assn. Handbook; 1925. Stations, freight depots, warehouses, shop plants, store houses, oil and paint houses, power plants, coaling stations. Recommendations on building location, some structural details, placing and protection of equipment, installation of heating and lighting equipment, storage and handling of hazardous materials, care and maintenance, fire protection and equipment—all with reference to reduction of fire hazard.

Society of Automotive Engineers. Aeronautic Safety Code; 1925. Approved by American Standards Assn. as D1–1925. Airdromes and Airways. Classification of airdromes as regards accommodations and equipment, size, approaches, and surface of landing fields, requirements on day and night markings, and illumination for land plane stations and seaplane stations. For airways, location of identification markers, identification of towns, arrangement of international or universal marker diagram.

U. S. Gov., Dept. of Commerce. Bureau of Standards. BH 1; 1923. Recommended Minimum Requirements for Small Dwelling Construction. Recommendations of building code committee on thickness, height, and bonding of exterior walls, proportions of piers, bearing areas of arches and lintels, quality and strength of the building materials used, recommended types and details of construction for economy, strength, and fire protective qualities for various types of masonry and frame construction.

References.—Building construction, general items. *See also* 518.50. *See* references under 518.50. Misc. building construction items. *See also* 518.59. Steel buildings and metal parts of buildings. *See also* 605.22. Sheet metal work, metal doors and trim, tin clad fire doors. *See also* 605.22. Sheet metal roofing. *See also* 604.3.

518.52 Foundations for Buildings

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Concrete Pavements and Foundations; 1929. General Requirements on construction of forms, placing of reinforcement and concrete, finishing and curing.

American Railway Engineering Assn. 1929 Manual. Masonry. Portland Cement Concrete, Plain and Reinforced; 1929. Includes footings, quality, and grade requirements for materials, mixing and placing concrete, bending moment formula, design and allowable stress requirements for reinforced footings, and unreinforced pedestals.

References.—Cement, concrete and mortar. *See also* 516.1, 516.3. Sand, gravel, broken stone, slag. *See also* 512. Reinforcement steel. *See also* 605.25. Building construction. *See also* 518.50, 518.51.

518.53 Walls and Partitions for Buildings

Associated Tile Manufacturers. K–300; 1924. Tilework, Basic specifications for tilework including walls and vertical surfaces, requirements for concrete, aggregates, mortar, metal lath, preparations for and requirements of scratch coat, installation of tile, grouting and joining.

Common Brick Manufacturers' Assn. of Am. Brick House. Undated. For walls of solid and ideal construction, requirements on laying of brick, mortar bed, proportion of full mortar joints, design and construction of ideal type walls.

Gypsum Assn. Gypsum Partition Tile; 1928. Specifications for Erection of Gypsum Partition Tile. Requirements on laying, anchoring, bonding, permissible height of partitions, construction of wood or metal bucks and of built-up, reinforced, rod reinforced, and metal lintels, composition of mortar, plastering requirements, installation of conduits and trim.

Gypsum Assn. Specifications Governing Gypsum Plaster Board Construction; 1923. Uses of gypsum plaster board, requirements on dimensions, transverse strength, methods of test, finish, erection on wood framing, erection on metal framing, design of fire resisting walls and partitions.

U. S. Gov., Dept. of Commerce. Bureau of Standards BH6; 1924. Recommended Minimum Requirements for Masonry Wall Construction. For exterior and interior masonry walls for all buildings, construction requirements recommended by building code committee for adoption by city and State code making bodies. Covers solid brick walls, walls of hollow tile, concrete block, concrete, and stone, hollow walls of brick, veneered walls, requirements on quality of materials, working stresses, thickness, bond, reinforcement, etc.

References.—Building construction. *See also* 518.50, 518.51. *See* references under 518.50.

518.54 Inclosures

National Board of Fire Underwriters. Code of Suggested Ordinances for Small Municipalities; 1928. Includes requirements on equipment and operation of motion picture machines and inclosures, requirements on minimum dimensions, materials and construction of walls, size of door, orifice, and ventilation opening, ventilation requirements, switch provisions, etc.

Underwriters' Laboratories (Inc.). Bandit Resisting Enclosures. 1930. For partitions, grille doors, and safety openings, capable of resisting the fire of pistols, installed between spaces where money is handled and lobby used by public, requirements on installation, gunfire resistance, type of gun ports for defense, locking of grille doors, height of construction, protection at top of partition, protection of windows, etc.

References.—Building construction. *See also* 518.50, 518.51. *See* references under 518.50.

518.55 Chimneys for Buildings

Common Brick Manufacturers' Assn. of Am. Brick House. Undated. For chimneys and fire places, requirements on minimum thickness of walls, flue lining and general construction.

Eastern Clay Products Assn. Flues and Flue Linings; 1927. Includes recommended specifications for brick chimneys with fire clay flue linings. Conforms to requirements in the Ordinance of National Board of Fire Underwriters and in proposed Code of Am. Soc. of Heating and Vent. Engrs., requirements on general quality of brick, proportioning of mortar mix, softening point of flue lining, placing of lining, smoke test of chimney.

National Board of Fire Underwriters. Recommended Standard Ordinance for Chimney Construction; 1927. General quality and softening point requirements for flue linings, installations in which flue linings may be omitted, requirements on height of chimney above roof, thickness of walls, flue area, type and mix of mortar, woodwork around chimneys, and other structural features.

References.—Fire clay flue linings, clay stove pipe. *See also* 534.29. Building construction. *See also* 518.50, 518.51. *See* references under 518.50. Regulations on chimney sizes for house heating boilers. *See also* 614.4.

518.56 Floors for Buildings

American Concrete Institute C–2A–23; 1923. Concrete Floors. Specifications of materials, construction, mixing, and curing. Proc. of A. C. I. for 1924, vol. 20, p. 739 with revision of paragraph 7 in vol. 21 of 1925, p. 596.

American Concrete Institute. Proposed Recommended Practice for Dusted-On Floor Finish. Proceedings of A. C. I., vol. 26, p. 530 (March, 1930, Journal). Limitations on type of concrete with which dusted-on finish may be used, types and general quality of materials and mix proportions for finish, placing and compacting, finishing by troweling and finishing by grinding.

American Concrete Institute. Proposed Recommended Practice for Heavy Duty Concrete Floor Finish with Notes on Light Duty Floor Finish. Proceedings of A. C. I., vol. 26, p. 527 (March, 1930, Journal). Requirements on preparation of base slab, general quality and screen grading of fine and coarse aggregate in the finish, mixture and consistency of concrete, placing and compacting, finished by troweling, by grinding.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Asphalt Block Floors; 1929. Foundation according to A. R. E. A. specifications, dimensions of blocks, pressure and temperature used in manufacture, making of mortar bed, laying blocks, construction of asphalt, sand, or grout joints, surfacing.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Railway Buildings, sec. 21. Brick Pavements and Floors. For brick floors, requirements on quality and size of brick, quality and screen grading of cushion sand, composition of grout and bituminous fillers, construction of foundation, laying of cushion, laying brick, tamping and rolling, application of fillers.

Associated Tile Manufacturers. K–300; 1924. Tilework. Basic specifications for installation of tilework including tiled floors, requirements for concrete, aggregates, mortar, shrinkage mesh, building paper, concrete and mortar setting beds in various applications, setting of tiles.

Common Brick Manufacturers' Assn. of Am. Brick House. Undated. For porch, terrace, and basement floors, thickness and mix of concrete base, laying of brick and construction requirements.

Maple Flooring Manufacturers Assn. Specification Form for Laying and Finishing MFMA Northern Hard Maple Flooring, Northern Beech and Birch Flooring. Undated. Requirements on size, spacing, and creosoting of sleepers, filling between sleepers, size of boards and nailing of sub floors, application of paper, laying of floors, sanding and finishing.

National Slate Assn. Slate Floors, Terraces and Walks. Undated. Suggested paragraphs for insertion in architects specification for laying of slate walks and floors on soil, on cinder sub-bed, on concrete in earth, and on masonry slab, construction and preparation of base on which slate is laid.

Portland Cement Assn. Concrete Floor Finishes; 1929. Includes typical working specifications for heavy-duty floor finish, light-duty floor finish, and terrazo floor finish. Requirements on level of striking off of base slab, quality and screen grading for fine and coarse aggregates, mix proportions, placing, compacting, finishing by troweling or grinding, curing and protection, thickness of topping.

References.—Tile flooring. *See also* 518.59, 534.25. Wood flooring. *See* 411.2. Hollow flooring tile. *See also* 534.22. Building construction. *See also* 518.50, 518.51. *See* references under 518.50.

518.57 Ceilings and Roofing for Buildings

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Slate Roofing; 1927. General quality of slate, type and weight of felt, type and size of nails, requirements for laying and nailing.

Associated Tile Manufacturers. K–300; 1924. Tilework. Basic specifications for installation of tilework including tiled ceilings, requirements for aggregates, concrete, mortar, metal lath, preparations for and requirements of scratch coat, setting of tile.

National Slate Assn. Slate Roofs; 1926. Specification "M." Sheet Metal Work for Slate Roofs. A construction specification with requirements on preparation of surfaces for flashings, use of building paper, weight of building paper, size of nails, thickness of copper, copper and solder according to A. S. T. M. specifications, heights, construction and application of flashings.

National Slate Assn. Slate Roofs; 1926. Specification "S." A construction and material specification covering weight of felt, thickness and dimensions of slate, requirements on laying of felt, on laying of slate for various roof constructions, sizes of copper nails, for standard slate roof.

National Slate Assn. Slate Roofs; 1926. Specification "T." For textural slate roof, requirements on weight of felt, thickness of slate, laying of felt, laying of slate for various roof constructions.

National Slate Assn. Slate Roofs; 1926. Specification "G." For graduated slate roof, requirements on weight of felt, range of thicknesses and widths of slate, laying of felt, laying of slate for various roof constructions.

U. S. Gov., Federal Specifications Board. 156; 1924. Installation of Metal Flashings with Bituminous Built-Up Roofing. Requirements on length of flashings, painting, depth and location of groove in wall, preparation of roof and installation of flashings.

U. S. Gov., Federal Specifications Board. 157; 1924. Installation of Plastic Flashings With Bituminous Built-Up Roofing. For flashings of asphalt saturated rag felt or of coal-tar saturated rag felt, requirements on installation of 3 layer flashings, amount of overlap on roof, depth of groove in wall, construction and application of counterflash, application of bituminous cement, etc.

References.—Sheet steel and tin roofing. *See also* 604.32, 604.31. Asphalt roofing, tar roofing. *See also* 505.16, 505.36. Slate roofing. *See also* 511.52. Roofing tiles. *See also* 534.23. Wood shingles. *See also* 402.52. Ceiling lumber. *See also* 411.3. Building construction. See also 518.50, 518.51. Metal ceilings for buildings. *See also* 605.22.

518.58 Beams and Columns for Buildings

American Concrete Institute. Tentative Regulations. E–1A–28T; 1928. Building Regulations for Reinforced Concrete. Includes specifications and rules of design of beams and columns, and flat slabs in construction of buildings. Proc. of A. C. I. for 1928, vol. 24, p. 791.

American Railway Engineering Assn. 1929 Manual. Masonry. Portland Cement Concrete, Plain and Reinforced; 1929. Includes reinforced beams, columns, slabs, quality and grade requirements for materials, mixing and placing concrete, reinforcement design, design formulas for flexure, proportions, and allowable stresses for rectangular and T beams, and for slabs, design formulas for allowable axial load, load and bending stresses for columns.

References.—Building construction. *See also* 518.50, 518.51. *See* references under 518.50.

518.59 Miscellaneous Specifications for Building Construction and Materials

American Concrete Institute. P–4A–26; 1926. Specifications and Building Regulations for Concrete Staves. Strength and absorption requirements, methods of test, limits of loading. Proc. of A. C. I. for 1926, vol. 22, p. 666.

Associated Tile Manufacturers. Tile Bathrooms and Tiled Floor or Wainscots; 1920. General requirements for sand, cinders, crushed stone, size of tile, preparation of foundation and setting floor tile, preparation of scratch coat and setting of wall tile.

National Assn. of Marble Dealers. Interior Marble Work; 1926. Explanatory of the material a specification for interior marble work should contain, includes grouping of marbles according to properties for finishing, kinds of finish and where used, standard and minimum thicknesses for marble for different applications, recommended details and methods of construction, 42 plates illustrating typical installations.

National Board of Fire Underwriters. Recommended Good Practice for the Construction and Protection of Airplane Hangars; 1930. Recommendations on height, area for sprinkled and for unsprinkled hangars, materials and types of construction in order of preference, floor drainage, lighting, power, heating, permissible repairing in hangar, construction of doping room, automatic sprinkler and standpipe and hose equipment.

National Board of Fire Underwriters. Construction and Operation of Pyroxylin Lacquer Manufacturing Plants; 1930. Requirements on type of protective construction of buildings of nonfireproof construction, inclosure of openings, height of door sills, construction of fire partitions, lighting and heating equipment, ventilation and fire protection, storage and handling of materials.

National Board of Fire Underwriters. Piers and Wharves, Construction and Protection, 1931. Recommended requirements on construction of two standard classes of piers or wharves including construction of substructures, fire bulkheads, and pier decks or floors and based on standard automatic sprinkler protection, including steel and concrete construction and heavy timber construction, fire protection requirements.

National Board of Fire Underwriters. Recommended Requirements for Marine Oil Terminals; 1930. For terminals for tankers and barges for handling flammable and refined oils, terminals for crude oil, and land and floating gasoline stations for small craft; requirements on construction of piers and wharves, piping, flexible hose connections, protective systems against fire and static electricity, operating requirements.

National Board of Fire Underwriters. Recommended Safeguards for the Coloring of fruits and Vegetables; 1930. Requirements on construction, general design, and automatic safety features for burner house for fruit coloring using kerosene burners; requirements on method of conducting ethylene from cylinders to coloring room and methods of measuring gas for ethylene method of coloring.

National Board of Fire Underwriters. Construction of Merchandise Vaults; 1930. For storage of furs, silks, etc., but not for highly inflammable materials, requirements on permissible materials for and thickness of walls, floors, and ceilings, construction and fire resistance of supports from ground to vault, fire classification of door, water tightness, lighting, refrigeration, and fire extinguishing equipment.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn. as C 1–1931. Transformer Vaults. Construction, thickness of walls and roof, ventilation, drainage and doorway requirements for reinforced concrete or brick vaults.

National Fire Protection Assn. Protection of Records; 1928. Includes vaults, ground supported and structure supported, requirements on materials and construction of walls, roof and floor, minimum wall thicknesses, for 6, 4, and 2 hour rated vaults, construction and insulation of vault doors, installation of filing equipment, lighting and ventilating.

References.—Building construction. *See also* 518.50, 518.51. *See* references under 518.50.

518.6 DRAINAGE STRUCTURES

518.60 General Items

American Assn. of State Highway Officials. Tentative Method. T–33. Undated. Method of Testing Culvert Pipe. For concrete pipe, method same as C 76–30T of Am. Soc. for Testing Materials, sections 20 to 27.

American Society of Civil Engineers. Manual of Engineering Practice No. 2; 1928. Definitions of Terms used in Sewerage and Sewage Disposal Practice.

American Society for Testing Materials. C 8–24; 1924. Terms Relating to Sewer Pipe. Definitions of kinds of raw materials, kinds of pipe as regards materials used, parts of pipe, types of joints, qualities of materials, visual defects.

American Society for Testing Materials. C 12–19; 1919. Recommended Practice for Laying Sewer Pipe. Preparing trenches and foundations, pipe laying, backfilling trenches.

518.61 Culverts and Culvert Pipe

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Monolithic Concrete Culverts. Requirements on general construction of footings, paved inverts, aprons, and curtain walls, mix proportions of concrete, and method of placing concrete.

American Assn. of State Highway Officials. Tentative Standard Specifications. M–41. Undated. Reinforced Concrete Culvert Pipe. Same as Am. Soc. for Testing Materials spec. C 79–30T, sections 1 to 19 and 28 to 34.

American Concrete Institute. J–2A–29T; 1929. Reinforced Concrete Culvert Pipe. Specifications as submitted by Joint Concrete Culvert Pipe Committee of A. C. I., A. S. T. M., Bur. Publ. Roads of U. S. Dept. of Agri., Am. Soc. Civil Engrs., Am. Assn. State Highway Off., Am. Rwy. Engr. Assn., Am. Conc. Pipe Assn. (See Proc. A. C. I. for 1929, vol. 25, p. 606.) For standard and extra strength pipe, cement and steel in accordance with A. S. T. M. specification, requirements on general quality and freedom from injurious amounts of organic and unsuitable material for fine and coarse aggregate, screen grading of fine aggregate, methods of design, permissible working stresses, standard sizes of pipe, placing reinforcement, strength tests and strength requirements.

American Railway Engineering Assn. 1929 Manual. Masonry. Reinforced Concrete Culvert Pipe; 1929. Cement and reinforcement bars according to A. R. E. A. specifications, reinforcement wire according to A. S. T. M. specifications, general quality of fine and coarse aggregates, design assumptions and requirements, placing of reinforcement, strength test and absorption test requirements, minimum dimensions and area of reinforcement for various loads.

American Society for Testing Materials. Tentative Specifications. C 76–30T; 1930. Reinforced Concrete Culvert Pipe. For standard and for extra strength reinforced culvert pipe, with cement and steel in conformity with A. S. T. M. specifications, requirements on general quality and screen grading of fine aggregate and general quality of coarse aggregate, design, construction, absorption, strength, methods of test, standard sizes.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Culverts. Requirements on excavation for foundation, construction of foundation fill, direction of lay of bell and spigot pipe, proportions of cement mortar, back filling, protection of pipe ends with masonry, etc.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Reinforced Concrete Pipe. Requirements on mix proportions of concrete, screen grading and general quality of sand and of coarse aggregate, structural details of bell and spigot ends for sizes above 12 inches, position of reinforcement, strength and absorption test according to A. S. T. M. methods, installation.

References.—Definitions and methods of test. *See also* 500, 518.60. Other specifications for culverts. *See* 518.41. Sand, gravel, broken stone, slag. *See also* 512. Concrete and mortar. *See also* 516.3. Rubble and ashlar masonry. *See also* 518.81, 518.82. Vitrified clay pipe. *See also* 531.5. Corrugated sheet metal culverts. *See also* 607.5. Cast-iron culvert pipe. *See also* 607.11. Brick masonry. *See also* 518.83.

518.62 Drains, Drain Tile, and Pipe

American Concrete Institute. P–7B–25; 1925. Concrete Drain Tile. Specification for material, sizes, chemical, physical, absorption and freezing test requirements. Published as tentative in Proc. of A. C. I. for 1924, vol. 20, p. 678.

American Society for Testing Materials. C 4–24; 1924. Joint sponsor with U. S. Dept. of Agriculture, approved by American Standards Assn. as A 6–1925. Drain Tile. Covers farm, standard, and extra quality drain tile of concrete or of clay, disallowed materials in chemical composition, requirements on crushing strength and absorption test, visual inspection, and where specified, freezing and thawing test requirements.

American Society for Testing Materials. Tentative Specifications. C 75–30T; 1930. Reinforced Concrete Pipe. For standard and for extra strength reinforced pipe, cement and steel in conformity with A. S. T. M. specifications, requirements on general quality and screen grading of fine aggregate, general quality of coarse aggregate, design, construction, strength, methods of test, standard sizes.

References.—Definitions, methods of test. *See also* 500., 518.60. Sand, gravel, broken stone, slag. *See also* 512. Cement, concrete and mortar. *See also* 516.1, 516.3. Vitrified clay pipe. *See also* 531.5.

Clay drain tile. *See also* 534.21. Sewers and sewer pipe. *See also* 518.67. Cast iron drain pipe. *See also* 607.11. Sheet metal pipe. *See also* 607.5. Plain concrete pipe. *See also* 518.67.

518.63 Curbs

American Concrete Institute. Tentative Specifications. S–6E–27T; 1927. Concrete Curb and Concrete Curb and Gutter. Specifications for materials, construction, dimensions, and curing. Proc. of A. C. I. for 1927, vol. 23, p. 684.

American Society of Municipal Engineers. Sidewalks and Curbs; 1927. Includes stone curbs and concrete curbs. For stone, absorption test and abrasive test requirements, dressing, cutting, limiting dimensions and setting requirements for granite, sandstone, bluestone, and limestone curbs. For concrete curb, poured in place and premolded, grade and general quality of fine, coarse, and mixed aggregates, mixing and placing concrete, and construction of curb.

Asphalt Institute. Tentative Specifications. C–3; 1920. Shoulders, Headers, Curbs, and Gutters. Includes curbs, general quality, wear, and screen grading requirements for coarse aggregate of broken stone, mine tailings, slag, or gravel, quality and grading of sand and stone screenings, composition and physical requirements for Portland cement, mixing of concrete, construction of curb.

References.—Granite, limestone, sandstone. *See also* 511.1, 511.2, 511.4. Sand, gravel, broken stone, slag. *See also* 512. Cement, concrete and mortar. *See also* 516.1, 516.3. Brick. *See also* 513, 534.11. Street pavements. *See also* 518.3. Sidewalks. *See also* 516.5.

518.64 Gutters

American Concrete Institute. Tentative Specifications. S–6E–27T; 1927. Concrete Curb and Concrete Curb and Gutter. Specifications for materials, construction, dimensions, and curing. Proc. of A. C. I. for 1927, vol. 23, p. 684.

Asphalt Institute. Tentative Specifications. C–3; 1920. Shoulders, Headers, Curbs, and Gutters. Includes gutters, general quality, wear, and screen grading requirements for coarse aggregate of broken stone, mine tailings, slag or gravel, quality and grading of sand and stone screenings, composition and physical requirements for Portland cement, mixing of concrete, construction of gutters.

References.—See references under 518.63.

518.65 Catch Basins, Inlets, Manholes

American Concrete Institute. P–1C–29; 1929. Concrete Manhole and Catch Basin Block. Strength and absorption requirements and methods of sampling and testing. Proc. of A. C. I. for 1927, vol. 23, p. 694.

American Electric Railway Engr. Assn. D200–29; 1929. Specification and Form of Contract for Electrical Conduit Construction. Includes manholes and concrete work about ducts, standard designs and wall thicknesses for concrete line, corner, and crossing manholes, laying and aligning of duct and pouring concrete around duct, cement according to A. S. T. M. spec. C–9, requirements on quality and screen grading limits for fine and coarse aggregates, strength test for sand mortar, mix proportions for concrete, quality, strength, and bend test requirements for wrought iron, general quality of cast iron, specifications for tile duct and fibre duct, installation of duct.

American Railway Assn. Telegraph and Telephone Section. 1–C–1; 1927. Communication Underground Conduit Construction. Includes construction of manholes, requirements on mixture of concrete, dimensions of manhole and thickness of walls, and placing of reinforcement.

American Society of Municipal Engineers. Sewers; 1927. For manholes and inlets of concrete or brick, requirements on class of concrete or of brick masonry to be used, laying of brick and width of joints, spacing and material of steps.

References.—Sand, gravel, broken stone, slag. *See also* 512. Cement, concrete and mortars. *See also* 516.1, 516.3. Brick. *See also* 513, 534.11. Brick masonry. *See also* 518.83. Manhole and conduit castings. *See* 611.12.

518.66 Retaining and Head Walls

References.—Riprap. *See* 511.72. Rubble and ashlar masonry. *See* 518.81, 518.82. Brick masonry. *See* 518.83. Stone masonry retaining walls. *See* 518.89.

518.67 Sewers and Sewer Pipe

American Concrete Institute. Tentative Specifications. P–7A–24T; 1924. Plain Concrete Sewer Pipe. Materials, dimensions, requirements and tests for loading, hydrostatic pressure and absorption. Proc. of A. C. I. for 1924, vol. 20, p. 669.

American Concrete Institute. Tentative Specifications. P–7C–25T; 1925. Reinforced-Concrete Sewer Pipe. Materials, design, load test and method of application, strength requirements and inspection. Proc. of A. C. I. for 1925, vol. 21, p. 584.

American Concrete Institute. S–3A–24; 1924. Monolithic Concrete Sewers and Recommended Rules for Concrete Sewer Design. Specifications for materials, reinforcement, iron castings, lining materials, concrete, forms, general sewer construction, and recommended design rules. Proc. of A. C. I. for 1924, vol. 20, p. 757.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes. Sewers and Drainage; 1926. General requirements on excavation, pumping and bailing, laying of pipe, back filling, general quality of vitrified sewer pipe, materials and mix proportions of mortar, general quality of brick and of cast iron manhole covers.

American Society of Municipal Engineers. Sewers; 1927. Cement and lime according to specifications of A. S. T. M., general quality and grade sizes of sand and crushed stone, transverse, crushing, and absorption test requirements for common brick, absorption and rattler test for vitrified brick, general quality, dimensions, and permissible defects of vitrified sewer pipe and of concrete pipe, with tests for crushing, hydrostatic pressure and absorption according to A. S. T. M. specifications, sizes, curing, crushing and absorption test requirements for reinforced concrete pipe, reinforcement according to A. S. T. M. specifications, general quality and dimensions of segmental vitrified tile blocks, general quality and dipping requirements for iron castings, general quality of lumber and wood piles, dimensions of piles, requirements on excavations, removing pavements, mixing concrete, and construction of concrete, brick, segmental block, and pipe sewers.

American Society for Testing Materials. C 14–24; 1924. Cement Concrete Sewer Pipe. Cement according to A. S. T. M. specifications C 9, general quality requirements, dimensions, test requirements for crushing, hydrostatic pressure, and absorption tests.

U. S. Gov., Federal Specifications Board. WW–P–371; 1931. Plain Concrete Pipe. Bell and spigot pattern for conveyance of sewage, industrial waste, and storm water, permissible defects, requirements on straightness, crushing strength, leakage under pressure, and absorption, standard sizes and lengths, dimensions of sockets, tolerances, methods of sampling and test.

References.—Definitions, methods of testing, methods of laying pipe. *See also* 518.60. Sand, gravel, broken stone, slag. *See also* 512. Cement, concrete and mortars. *See also* 516.1, 516.3. Brick for sewers. *See also* 534.11. Brick masonry. *See also* 518.83. Vitrified clay lining plates. *See also* 534.29. Reinforcement steel. *See also* 605.25. Clay drain tile. *See also* 534.21. Vitrified clay pipe. *See also* 531.5. Concrete drain pipe. *See also* 518.62. Cast iron sewer pipe. *See* 607.11.

518.7 RESERVOIRS, TANKS, POOLS, ETC.

518.71 Fuel Storage Tanks

American Concrete Institute. Recommended Practice and Tentative Specifications. Concrete Fuel Oil Tanks; 1923. Recommendations on reinforcement, materials, mixing, placing, forms, and construction. Proc. of A. C. I. for 1923, vol. 19, p. 420.

National Board of Fire Underwriters. Containers for Storing and Handling Flammable Liquids; 1927. Includes concrete fuel oil storage tanks, design, minimum thickness of walls, allowable unit stresses, cement according to A. S. T. M. specifications, grading and quality tests for fine aggregate, grading of coarse aggregate, mixing and placing concrete, construction of forms and placing reinforcement, finish requirements.

References.—Sand, gravel, broken stone, slag. *See also* 512. Cement, concrete and mortars. *See also* 516.1, 516.3. Reinforcing steel. *See also* 605.25. Steel tanks. *See* 605.23. Other tanks. *See* 956.2.

518.72 Viaducts

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Concrete Viaducts. For concrete slab and girder structures supported on bents or towers of concrete columns, requirements on type and mix of concrete, construction of forms, placing of concrete, and finish, superstructure same as specified for concrete slab and girder bridges.

References.—Sand, gravel, broken stone, slag. *See also* 512. Cement, concrete and mortars. *See also* 516.1, 516.3. Reinforcing steel. *See* 605.25.

518.73 Swimming Pools

Associated Tile Manufuacturers. K–300; 1924. Tilework. Basic specifications for installation of tilework including special requirements applicable to swimming pools, requirements for concrete, mortar, metal lath, mortar setting beds, and scratch coats, setting of tile.

Portland Cement Assn. Concrete Swimming Pool Construction; 1928. Cement and reinforcement in accordance with specifications of A. S. T. M., suggested requirements on general quality and screen grading of fine and coarse aggregates, permissible clay in fine aggregate, general quality of water, mixing and placing concrete, and general construction requirements.

References.—Sand, gravel, broken stone, slag. *See also* 512. Cement, concrete and mortars. *See also* 516.1, 516.3. Reinforcing steel. *See* 605.25. Glazed tile for tiling. *See also* 534.25.

518.74 Watering Troughs

518.75 Reservoirs

518.76 Spillways

518.77 Cofferdams

518.8 MASONRY

518.81 Dry Rubble Masonry

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Dry Rubble Masonry. For coursed, random and random range work, requirements on general quality, minimum dimensions, and proportions of stone, shaping and laying of stone, design and construction of copings.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Dry Rubble Masonry. Requirements on general quality of stone and minimum dimensions, base thickness in relation to height, number of headers, breaking of joints, and general structural features.

References.—Definitions. methods of sampling and of testing. *See also* 510. Masonry stone. *See also* 511.1, 511.2, 511.4, 511.9. Riprap. *See also* 511.72.

518.82 Cement Rubble Masonry

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Ashlar Masonry. Requirements on general quality of stone, minimum dimensions, types of surface finish, proportions of stretchers, design and construction of headers, cores, and backing, laying stone, construction of copings, pointing.

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Mortar Rubble Masonry. Requirements on general quality of stone, minimum dimensions and proportions of stone, design of headers, shaping of stone, laying of stone, design and construction of copings, pointing.

National Board of Fire Underwriters. Building Code; 1931. Stone Masonry. Requirements on number and size of header stones and bonding, laying of stone, thickness and bonding of ashlar facings, type of mortar, thickness of stone walls for buildings.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Cement Rubble Masonry. Requirements on screen grading, color test and mortar strength test for sand, on general quality and minimum dimensions of stone, methods of construction, number of headers, thickness of joints, etc.

References.—Definitions. methods of sampling and of testing stone. *See also* 510. Masonry stone. *See also* 511.1, 511.2, 511.4. 511.9. Cement, concrete and mortars. *See also* 516.1, 516.3. Building construction. *See also* 518.50, 518.51. Stone masonry. *See also* 518.89.

518.83 Brick Masonry

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Brick Masonry. Brick according to specifications of Am. Soc. for Testing Materials, requirements on laying of brick and general construction of walls, piers, and copings.

American Railway Assn. Telegraph and Telephone Section. 1–C–1; 1927. Communication Underground Conduit Construction. Includes brick manholes, construction, dimensions, and thickness of walls.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes. Brickwork; 1929. Requirements on brick laying and thickness of joints, general quality of sand, lime, and mortar for common brickwork and for face brickwork, lining of flues, etc.

Common Brick Manufacturers' Assn. of Am. Brick House. Undated. For bricklaying, requirements on laying of brick, full bed of mortar, proportion of full mortar joints, bricklaying and type of mortar for floors, sills, footings, construction and design of ideal type wall.

National Board of Fire Underwriters. Building Code; 1931. Brick Masonry. Requirements on frequency of header courses and bonding, laying of brick, type of mortar, thickness of walls, for building construction.

Common Brick Mfrs. Assn. of America. Suggested Specifications for Brickwork; 1930. For building construction, includes requirements on bricklaying such as wetting of brick, bonding, construction and thickness of joints, construction at intersecting walls, facing and back-up, setting of door frames, waterproofing, connecting with existing work, cement and lime in accordance with A. S. T. M. specifications, etc.

References.—Sand lime brick. *See also* 513. Clay brick. *See also* 534.11. Fire clay brick. *See also* 534.12. Concrete brick. *See also* 516.4. Cement, concrete and mortars. *See also* 516.1, 516.3. Walls and partitions of building. *See also* 518.53. Building construction. *See also* 518.50, 518.51.

518.84 Masonry Arches

American Railway Engineering Assn. 1929 Manual. Masonry. Stone Masonry; 1924. Includes arch masonry of ashlar stone and block rubble, general quality requirements for stone, mixing of mortar, rules for laying stone and pointing, construction of falsework, dressing, face and backing.

References.—Definitions, methods of sampling and of testing stone. *See also* 510. Masonry stone. *See also* 511.1, 511.2, 511.4, 511.9. Cement, concrete and mortars. *See also* 516.1, 516.3. Bridge arches. *See also* 518.46, 518.89. Building construction. *See also* 518.50, 518.51.

518.85 Monuments

518.89 Miscellaneous Specifications for Masonry

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes. Stone Masonry and Cut Stone Work; 1929. Requirements on general quality of stone, sizes of submitted samples, general requirements on cutting and finish, composition and mix proportions of mortar, setting of stone, permissible joint width, construction of broken coursed ashlar and of boulder masonry.

American Railway Engineering Assn. 1929 Manual. Masonry. Stone Masonry; 1924. Cement and concrete according to specifications of A. R. E. A., general quality requirements for stone, mixing of mortar, rules for laying stone and pointing; dressing, construction of face, backing, and coping, proportions of stretchers and headers for ashlar stone bridge and retaining wall masonry; falsework, dressing, face and backing requirements for ashlar stone and block rubble arches, construction of culvert masonry and dry masonry retaining walls and slope walls.

Cast Stone Institute. Architectural Specification for Cast Stone; 1930. For erection of cast stone, finish classification for surfaced cast stone and for cut cast stone, quality and finish according to sample, requirements on mix proportions and preparation of Portland cement mortar for setting cast stone, setting, grouting and caulking of cornice joints, etc.

References.—Definitions, methods of sampling and of testing stone. *See also* 510. Masonry stone. *See also* 511.1, 511.2, 511.4, 511.9. Sand, gravel, broken stone, slag. *See also* 512. Cement, concrete and mortars. *See also* 516.1, 516.3. Cast stone, concrete blocks. *See* 516.4.

518.9 MISCELLANEOUS CONSTRUCTION WORK

American Electric Railway Engr. Assn. D200–29; 1929. Specification and Form of Contract for Electrical Conduit Construction. Includes concrete work in laying of tile and fiber conduit. cement according to A. S. T. M. Spec. C–9, requirements on quality and screen grading limits for fine and coarse aggregates, mortar strength test for sand, mix proportions for concrete, installation of duct.

American Petroleum Institute. Code No. 4; 1928. Recommended Field Practice for Standard Rigs and Derricks. Includes appendix on specifications for concrete derrick foundations and design of foundations.

American Railway Assn. Telegraph and Telephone Section. 1–C–1; 1927. Communication Underground Conduit Construction. Includes concrete construction in placing of underground conduit and construction of manholes, trenching, grading, method of laying wood duct, vitrified clay duct, iron or steel pipe, and fiber duct, mixing and placing of concrete, thickness of concrete required; for manholes, mixture of concrete, dimensions of manhole and thickness of walls, placing of reinforcement.

Associated Factory Mutual Fire Insurance Companies. Gravity Water Tanks and Steel Towers, vol. 1. Structural Details; 1930. For concrete foundations for tanks and towers, requirements as to concrete mixture, construction of piers, anchorage requirements, permissible bearing pressures, details of concrete design according to A. S. T. M. specifications.

National Board of Fire Underwriters. Construction of Incinerators; 1928. Covers nonfuel fired incinerators, fuel fired incinerators for garbage and waste, rubbish and waste material incinerators, permissible locations, layout of chutes, dimensions of brick walls and fire brick linings, gauge of metal in smoke pipes and fire brick lining requirements for different capacity incinerators.

National Electric Light Assn. Proceedings, vol. 81. p. 1776; 1924. Typical Form of Specifications for Underground Conduit Construction. Covers suggested contract specification for excavation, sheeting, pumping, back filling, duct laying, manholes, rodding, etc., includes requirements on proportions and mixing of concrete, general quality of sand, general quality and grading of broken stone and gravel.

Portland Cement Assn. Suggested Specifications for Concrete Lined Shafts; 1927. Cement and reinforcement steel according to A. S. T. M. specifications, requirements on materials, general quality, and screen grading of fine and of coarse aggregates, general quality of water, excavation, construction of forms, placing of reinforcement, proportions of concrete, mixing, placing, and waterproofing concrete.

Portland Cement Assn. S–105; 1931. Suggested Specifications for Reinforced Concrete Tennis Courts. Requirements on construction of subgrade, screen sizes of aggregate, amount of reinforcement, thickness of slab, dimensions of court. proportioning, mixing, and placing of concrete provision of expansion joints, etc.

References.—Sand, gravel, broken stone, slag. *See also* 512. Cement, concrete and mortars. *See also* 516.1, 516.3. Portable gas incinerator. *See* 997.2.

520–529 GLASS AND GLASS PRODUCTS

520. GENERAL ITEMS

American Ceramic Society. Journal of A. C. S. for June, 1928. Tentative Methods. Analysis of Glass; 1926. Preparation and fusion of sample. method for determination of silica, iron and alumina, lime, magnesia, and alkalis.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl; 1927. Standard Samples. Glass. Sample No. 80 for soda-lime glass, No. 89 for lead-barium glass, No. 91 for opal glass, No. 92 for standard low boron glass, and No. 93 for standard high boron glass (Pyrex), sample prepared and sold by the bureau with a certificate of its analysis, for use by industrial organizations and others as a comparison standard in checking the accuracy of analysis of glass, etc.

521. FLAT GLASS

521.0 GENERAL ITEMS

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stock; 1930. Report of committee recommending list of standard sizes to be carried in stock of double strength window glass.

521.1 PLATE GLASS

American Marine Standards Committee. H No. 1–1925. Glass for Air Ports and Fixed Lights. Dimensional drawing with tolerances. Material to be according to F. S. B. specification No. 123.

Plate Glass Manufacturers of America. Polished Plate Glass; 1928. Standard stock thickness of polished plate glass for glazing purposes is between $\frac{5}{32}$ and $\frac{9}{32}$ inch, tolerance in thickness when thickness is specified.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Plate Glass; 1928. Two grades specified for windshields and front quarter windows, selected glazing and glazing, with definitions of each, thickness requirements and tolerances.

U. S. Gov., Federal Specifications Board. 123; 1924. Flat Glass for Glazing Purposes. Polished plate glass. Superseded by Federal specification DD–G–451; 1931, given below.

U. S. Gov., Federal Specifications Board. DD–G–451; 1931. Flat Glass for Glazing Purposes. Includes polished plate glass and ornamental or polished figured plate glass. For polished plate glass, standard thicknesses and tolerances, permissible defects for two quality grades dependent on size; for ornamental or polished figured plate glass, definition, standard thickness, nonpermitted defects.

References.—Methods of analysis, standard samples of glass. *See also* 520. Sand for glass. *See* 512.12. Lime for glass. *See* 517.2. Limestone for glass. *See* 511.2.

521.2 CLEAR WINDOW GLASS

U. S. Gov., Federal Specifications Board. DD–G–451; 1931. Flat Glass for Glazing Purposes. Clear window glass. For single strength, double strength, and heavy sheet glass, standard thicknesses, tolerances in thickness and average weight, recommended maximum dimensions, permissible curvature, permissible defects for 2 quality grades, methods of examination.

References.—Methods of analysis, standard samples of glass. *See* 520. Standard sizes. *See also* 521.0. Sand, lime, and limestone for glass. *See* 512.12, 517.2, 511.2.

521.3 WIRE GLASS

U. S. Gov., Federal Specifications Board. DD–G–451; 1931. Flat Glass for Glazing Purposes. Wire glass. Standard thicknesses and tolerances, nonallowable defects, tolerances on dimensions ordered, methods of examination.

References.—Methods of analysis, standard samples of glass. *See* 520. Standard sizes. *See* 521.0. Sand, lime, limestone for glass. *See also* 512.12, 517.2, 511.2.

521.4 ROLLED FIGURED SHEET GLASS

U. S. Gov., Federal Specifications Board. DD–G–451; 1931. Flat Glass for Glazing Purposes. Rolled figured sheet glass. Made in a wide variety of surfaced finishes for obscuring vision and for decorative effect, standard thicknesses and tolerances, maximum sizes, nonallowable defects, for 1 quality grade.

References.—Methods of analysis, standard samples of glass. *See* 520. Standard sizes. *See* 521.0. Sand, lime, limestone for glass. *See also* 512.12, 517.2, 511.2.

521.5 PRISM GLASS

U. S. Gov., Federal Specifications Board. DD–G–451; 1931. Flat Glass for Glazing Purposes. Prism glass. For a rolled sheet glass with or without wire or for a pressed tile, nonallowable defects, tolerances in thickness and dimensions, maximum sizes, standard thicknesses, standard tile sizes, methods of examinations.

References.—Methods of analysis, standard samples of glass. *See* 520. Sand, lime, limestone for glass. *See also* 512.12, 517.2, 511.2.

521.6 SPECIAL QUALITY GLASS

U. S. Gov., Federal Specifications Board. DD–G–451; 1931. Flat Glass for Glazing Purposes. Glass for absorbing and intercepting ultra-violet and infra-red rays. It may be rolled figured sheet or wire glass, requirements on minimum permissible amount of ultra-violet and of infra-red rays to be excluded.

References.—Methods of analysis, standard samples of glass. *See* 520. Sand, lime, limestone for glass. *See also* 512.12, 517.2, 511.2.

521.7 SIDEWALK AND SKYLIGHT GLASS

U. S. Gov., Dept. of Commerce. Bureau of Standards. R49; 1926. Sidewalk, Floor, and Roof Lights. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes of round glass and square glass sidewalk lights and floor lights, designating thickness of supporting edge, size of shield, and distance on centers.

References.—Methods of analysis, standard samples of glass. *See* 520. Sand, lime, limestone for glass. *See also* 512.12, 517.2, 511.2.

521.8 GLASS PARTITIONS AND INCLOSURES

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Bath inclosures with and without lead pan. For shower bath and dressing room inclosures of marble, slate, soapstone, or glass, dimensions of slabs and of assembled inclosures, details of joints, construction requirements for concrete floor foundation and for placing lead pan, general quality and finish requirements for slate and soapstone.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Water-Closet Inclosures and Partitions. For marble, slate, soapstone, or glass, dimensions of slabs and of assembled inclosures and partitions, general quality and finish requirements for slate and soapstone.

References.—Methods of analysis, standard samples of glass. *See* 520. Sand, lime, limestone for glass. *See also* 512.12, 517.2, 511.2.

521.9 MISCELLANEOUS FLAT GLASS

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Glass Shelf. Dimensions of shelf and cast brass bracket, chemical composition of brass, nickel plating requirements and tests.

References.—Methods of analysis, standard samples of glass. *See* 520. Sand, lime, limestone for glass. *See also* 512.12, 517.2, 511.2.

522. GLASS CONTAINERS

References.—Bottles, carboys, flasks, jars, and demijohns. *See* 955.

523. TABLE GLASSWARE

523.0 GENERAL ITEMS

523.1 VINEGAR BOTTLES

U. S. Gov., Federal Specifications Board. 121a; 1926. Glass Tableware. For blown or pressed ware and for cut ware, covering tumbler, vinegar bottle, sirup pitcher, salt and pepper shakers, requirements on general quality, materials, percentage of lead oxide and specific gravity of cut ware, tolerances in dimensions, capacity, and weight, boiling and shock test requirements.

References.—Methods of analysis, standard samples of glass. *See* 520. Pressed ware (bottles). *See also* 523.9.

523.2 PITCHERS

U. S. Gov., Federal Specifications Board. 121a; 1926. Glass Tableware. For sirup pitchers of blown or pressed ware and of cut ware, requirements on general quality, materials, percentage of lead oxide and specific gravity of cut ware, tolerances in dimensions, capacity, and weight, boiling and shock test requirements.

References.—Methods of analysis, standard samples of glass. *See* 520. Pressed ware (pitchers). *See also* 523.9.

523.3 GLASS SALT SHAKERS

U. S. Gov., Federal Specifications Board. 121a; 1926. Glass Tableware. For salt shaker and for pepper shaker of blown or pressed ware and of cut ware, requirements on general quality, materials, percentage of lead oxide and specific gravity of cut ware, tolerances in dimensions, capacity, and weight, boiling and shock test requirements.

References.—Methods of analysis, standard samples of glass. *See* 520. Pressed ware (shakers). *See also* 523.9.

523.4 TUMBLERS

U. S. Gov., Dept. of Commerce. Bureau of Standards. R91–29; 1929. Glass Containers for Preserves, Jellies, and Apple Butter. Simplified practice recommended and accepted by industry, limits the stock sizes of jelly tumblers and of preserve jars to the content capacities given in the publication.

U. S. Gov., Federal Specifications Board. 121a; 1926. Glass Tableware. For tumbler of blown or pressed ware and of cut ware, requirements on general quality, materials, percentage of lead oxide and specific gravity of cut ware, tolerances in dimensions, capacity, and weight, boiling and shock test requirements.

References.—Methods of analysis, standard samples of glass. *See* 520. Pressed ware (tumblers). *See also* 523.9.

523.9 MISCELLANEOUS TABLE GLASSWARE

American Marine Standards Committee. O No. 8–1926. Kinds and Sizes of Glassware for Ship Equipment. Kinds and sizes of blown ware and pressed ware listed as standard equipment.

524. LIGHTING GLOBES AND SHADES

American Railway Assn. Signal Section. 5927; 1927. Hand Lantern Globes. Globes of clear, red, yellow, green, or blue low expansion glass, dimensions, requirements for boiling water test, photometric values, and chilling test.

American Society for Testing Materials. D 187–30, D 219–30, D 239–30; 1930. Method of Test for Burning Quality of Kerosene Oils, Long Time Burning Oil for Railway Use, and Mineral Seal Oil. Included in each specification are dimensional requirements for the lamp chimneys used with standard testing lamps.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Permanent Water-tight Fixtures. For outside lighting fixtures, recommended requirements on permissible temperature rise of fixture, provision of water-tight globe and of guard about lamp, threading requirements for 2 sizes of globes and of base of fixture.

U. S. Gov., Federal Specifications Board. 122; 1924. Glass Lantern Globes and Lamp Chimneys. For clear and colored lantern globes for hand lanterns and for railway signal lanterns, and for clear lamp chimneys, requirements on straightness and trueness and freedom of glass from bubbles and defects, sudden chilling test and boiling test.

References.—Methods of analysis, standard samples of glass. *See* 520. Electric lamps. *See* 716.1. Electron tubes. *See* 718.62. Oil lamps and lanterns. *See* 997.1.

525. LENSES

References.—Binoculars, telescopes and optical goods. *See also* 914.

525.0 GENERAL ITEMS

U. S. Gov., Dept. of Commerce. Bureau of Standards. C27; 1918. Properties and Testing of Optical Instruments. Description of test methods and list of tests which the bureau will make on demand with fees charged, for spectacle lenses, field glasses, telescopes, etc., for single lenses, for compound lenses, such as photographic objectives, etc.

525.1 LIGHTHOUSE LENSES

525.2 REFLECTORS

References.—Glass reflectors for headlights and searchlights. *See* 716.2.

525.3 SIGNAL LAMP LENSES

American Electric Railway Engr. Assn. Recommended Practice. S105–25; 1925. Sizes of Lenses for Use in Light Signals.

American Railway Assn. Signal Section. Highway Crossing Signals; 1928. For flashing light type, includes requirements for size and transmission values of lenses and roundels.

American Railway Assn. Signal Section. 6918; 1918. Signal Roundels, Lenses, and Glass Slides. Minimum allowable index of refraction and specific gravity, colors, dimensions, design, and types, photometric and spectrophotometric analysis requirements for roundels, lenses, and slides, focal lengths for lenses.

References.—Methods of analysis, standard samples of glass. *See* 520. Testing of lenses. *See* 525.0. Color definitions of traffic signal lenses. *See* 718.5.

525.4 AUTOMOBILE LAMP LENSES

Society of Automotive Engineers 1931 Handbook. Lamp Lenses; 1929. Diameter of lens and of prismatic area, thickness of lens flange for various sizes on head lamp lenses, diameters of tail lamp lens, of spot lamp lens, of side lamp lens, of motorcycle head lamp lens, minimum light openings in doors of spot lamps and side lamps, thickness of lens edge for motorcycle head lamp lens.

References.—Methods of analysis, standard samples of glass. *See* 520.

526. CHEMICAL LABORATORY AND OTHER GLASSWARE

526.1 GLASS INSULATORS

National Electric Light Assn. Suggested Specifications. D590–23; 1923. Side Groove Pin Insulator (Glass).—D591–23; 1923. Top Groove Pin Insulator (Glass).—D592–23; 1923. Service Pin Insulator (Glass). For green glass insulators, requirements on dimensions and allowable variations, minimum thickness of wall, threading, for one size of each type. Published in 1924 N. E. L. A. proceedings.

References.—Methods of analysis, standard samples of glass. *See* 520. Porcelain insulators. *See* 532.22. Thread gages for insulators. *See also* 615.82.

526.2 CHEMICAL LABORATORY GLASSWARE

References.—Methods of analysis, standard samples of glass. *See* 520. Surgical and medical instruments. *See* 915.2. Burettes and pipettes. *See* 918.1. Beakers, graduates, funnels. *See* 918.2. Glass tubing and tubes. *See* 918.7. Hydrometers, thermometers. *See* 919.4, 919.8. Biological laboratory apparatus. *See* 918.8. Laboratory flasks. *See* 918.9. Bottles, jars. *See* 955.1, 955.4.

526.3 COVER GLASSES

526.4 GLASS TUBES AND TUBING

References.—Glass tubes and tubing. *See* 918.7.

526.6 WATER GAUGES

American Railway Assn. Mechanical Division. Recommended Practice; 1925. Water Gauge and Lubricator Glasses. Reflex, tubular, bulls eye types of water gauge glasses and bulls eye type of lubricator gauge glass for locomotive and stationary boilers. Optical, change in temperature, solubility, and pressure test requirements, permissible variation in dimensions.

References.—Methods of analysis, standard samples of glass. *See* 520.

526.9 MISCELLANEOUS SPECIFICATIONS FOR GLASS

U. S. Gov., Federal Specifications Board. DD–C–791; 1930. Pin and Sponge Cups. Requirements on dimensions and shape of 1 type of cup made of glass, general quality of glass, drop test requirements.

References.—Methods of analysis, standard samples of glass. *See* 520. Electron vacuum tubes. *See* 718.62.

527. MIRRORS

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS27–30; 1930. Plate Glass Mirrors. A commercial standard selected and accepted by industry establishing 5 quality grades, permissible defects in the glass for each grade, thickness, time guarantee on silvering, guarantee labeling of mirrors.

References.—Other plate glass. *See* 521.1. Methods of analysis, standard samples of glass. *See* 520.

530–539 CLAY AND CLAY PRODUCTS

531. CLAY

531.0 GENERAL ITEMS

American Ceramic Society. Journal of A. C. S. for June, 1928. Method for Sampling Ceramic Materials as Delivered; 1922. Time of sampling, method of collecting and size for underground material and for ground or pulverized material, treatment of gross sample.

American Ceramic Society. Journal of A. C. S. for June, 1928. Tentative Method. Sampling Clay Deposits. Method for preliminary and for extended sampling.

American Ceramic Society. Journal of A. C. S. for June, 1928. Method for Drying Shrinkage; 1920. Size and preparation of test pieces, method for measurement of plastic volume, dry volume and determination of volume shrinkage and linear shrinkage.

American Ceramic Society. Journal of A. C. S. for June, 1928. Method for Behavior in Firing. For determination of progressive change in porosity and progressive change in volume in the firing process for clay, requirements on preparation of test pieces, placement in furnace, rate of heating, drawing from furnace, cooling, weighing, saturating and weighing, for samples drawn at different temperatures, calculation of apparent porosity, volume change, apparent and bulk specific gravity, and absorption.

American Ceramic Society. Journal of A. C. S. for June, 1928. Tentative Test Method. Sag Tests; 1928. For determination of rate of softening under fixed conditions of load and heat treatment, as evidenced by transverse bending. Requirements on shape and size of test pieces, heating rate and transverse loading for clay and for fine and coarse grog bodies, determination of warpage ratio.

American Ceramic Society. Journal of A. C. S. for June, 1928. Method for Shrinkage and Pore Water; 1928. Method of determination from data on plastic volume and dry volume.

American Ceramic Society. Journal of A. C. S. for June, 1928. Method for Slaking Test; 1928. Size and preparation of test piece, procedure for testing time of slaking.

American Ceramic Society. Journal of A. C. S. for June, 1928. Specific Gravity. Requirements on sampling and crushing of samples, method for determination of true specific gravity, apparent specific gravity, and bulk specific gravity.

American Ceramic Society. Journal of A. C. S. for June, 1928. Tentative Test Method. Transverse Strength; 1928. Preparation, shape, and size of test specimen, drying of specimen, test procedure, calculation of modulus of rupture, for clay specimens.

American Ceramic Society. Journal of A. C. S. for June, 1928. Method for Water of Plasticity; 1920. Size and preparation of test piece, method of test by drying test piece and calculating the water of plasticity from loss in weight.

American Ceramic Society. Journal of A. C. S. for June, 1928. Method of Testing for Pyrometric Cone Equivalent; 1928. Applicable to fire brick, refractory materials and clays. Requirements on sampling, size, shape, and preparation of test cones, rate of heating and method for determination of softening point.

American Society for Testing Materials. C 71–28 and C71–31T; 1931. Definitions of Terms Relating to Refractories. Standard definitions of fire clay, plastic fire clay, diaspore clay, nodular fire clay, spalling pyrometric cone equivalent, and of heat transmission terms.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Clay. Sample No. 97 for flint clay and No. 98 for plastic clay, prepared and sold by the bureau with a certificate of analysis in each case, for use in industry and by others as comparison standards for checking the accuracy of analyses of clays, etc. Analysis of each shown in supplement.

531.1 BALL CLAY

531.2 CHINA CLAY

531.3 FIRE CLAY

American Marine Standards Committee. E No. 13–1927. Fire-Clay Refractories for Marine Service. Test requirements for grades of fire clay brick, fire clay, and plastic refractory, including composition, softening point, quenching, load, etc.

U. S. Gov., Federal Specifications Board. HH–C–451; 1930. Fire Clay. For a fine class and a commercial class, requirements on fineness, bond, and softening point, methods of sampling and test.

U. S. Gov., Federal Specifications Board. SS–R–191; 1930. Plastic Fire Clay Refractories. For fire clay, requirements on silica content, softening point, water content, dry and burned shrinkage, methods of sampling and test.

References.—Definitions. *See* 531.0. Methods of sampling and of testing. *See also* 531.0. Fire brick and tile. *See also* 534.12. Fire clay flue lining. *See also* 534.29.

531.4 KAOLIN

American Pharmaceutical Assn. National Formulary; 1926. Kaolin. For medicinal purposes, description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

531.5 CLAY PRODUCTS, PIPE, CONDUIT, ETC.

American Assn. of State Highway Officials. Tentative Method. T–33. Undated. Method of Testing Culvert Pipe. For vitrified clay pipe, method same as in C 76–30T of Am. Soc. for Testing Materials, sections 20 to 27.

American Railway Assn. Electrical Section. XVIII–a–21; 1921. Underground Conduit Construction for Power Cables. Vitrified Clay Ducts. Requirements on general quality and construction, permissible defects, standard length, tolerance on inside dimensions, minimum wall thickness, mandrel test, water absorption test, freedom from alkalies and acids, installation rules.

American Railway Assn. Signal Section. 2412; 1912. Vitrified Clay Conduit. Covers sewer pipe style round or square bore and multiple duct square bore conduit for wires and cables, dimensions, general quality and permissible size of defects, finish, test requirements for straightness, alkalinity, and water absorption.

American Society of Municipal Engineers. Sewers; 1927. Includes vitrified sewer pipe, general quality, dimensions, permissible defects, sand-bearing crushing test, hydrostatic test, and absorption test according to A. S. T. M. specifications.

American Society for Testing Materials. C 13–24; 1924. Clay Sewer Pipe. Disallowed chemical components in composition of pipe, general quality requirements, dimensions, test requirements for crushing strength, hydrostatic pressure, and absorption.

Eastern Clay Products Assn. Standards; 1928. Salt Glazed Vitrified Sewer Pipe and Fittings. Dimensions of standard single and double strength pipe up to 36 inch size, dimensions of Ts, Ys, bends, traps, etc.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Vitrified Clay Pipe. General quality requirements for No. 1, standard weight, socketed, vitrified clay pipe, permissible size of cracks and fractures, scoring of large sockets and spigots, method of making joints and mix requirements for cement mortar.

References.—Methods of sampling and of testing clay and clay products. *See also* 531.0. Porcelain products. *See also* 532.2. Bricks and tiles. *See also* 534. Burnt clay ballast. *See also* 511.73.

531.6 ENAMEL FOR ENAMELWARE

American Ceramic Society. Journal of A. C. S. for Sept., 1930. Method of Test for Determination of Deformation Temperature of Enamel; 1930. Requirements on preparation of sample, test procedure, rate of heating, etc.

American Ceramic Society. Journal of A. C. S. for Sept., 1930. Method of Test for Fineness of Wet-Milled Enamel; 1930. Standard method for sieve testing of fineness.

American Ceramic Society. Journal of A. C. S. for Sept., 1930. Tentative Test Method. Determination of Resistance of Sheet-Steel Enamel to Deflection; 1930. Requirements for test machine, preparation of test pieces, test procedure.

References.—Methods of testing clay and clay products. *See also* 531.0. Enameled cast-iron bath tubs and sinks. *See* 612.21, 612.23.

532. CHINA AND PORCELAIN WARE

532.1 TABLE CHINAWARE

American Marine Standards Committee. O No. 24–1929. Chinaware for Ship Equipment. List of standard sizes of chinaware of three weights. Same as simplified practice recommendation of Div. of simplified practice of Bureau of Standards for shore service chinaware.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R39; 1925. Dining Car Chinaware. Simplified practice recommended and accepted by industry establishing a limited list of standard types and sizes of dining car chinaware, plates, butters, dishes, bakers, bowls, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards R33; 1924. Chinaware for Cafeteria and Restaurant. Simplified practice recommended and accepted by industry establishing a limited list of recognized types, sizes, and styles of cafeteria and restaurant chinaware, plates, butters, bowls, cups, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards R5; 1924. Hotel Chinaware. Simplified practice recommended and accepted by industry establishing a limited list of recognized types and sizes of hotel chinaware, as plates, dishes, bakers, bowls, cups, etc., limitation to 3 weight grades.

U. S. Gov., Dept. of Commerce. Bureau of Standards R40; 1925. Hospital Chinaware. Simplified practice recommended and accepted by industry establishing a limited list of standard types and sizes of hospital chinaware, plates, butters, dishes, bakers, bowls, etc.

U. S. Gov., Federal Specifications Board. 243a; 1926. Vitrified Chinaware. For thick china, hotel or rolled edge china, and medium weight china, requirements on dimensions, shapes, and weights, test requirements on absorption, impact, and chipping. Includes plates, saucers, cups, platters, bakers, and bowls.

References.—Methods of sampling and of testing clay and clay products. *See also* 531.0. Table glassware. *See* 523.

532.2 PORCELAIN PRODUCTS

References.—Table chinaware. *See* 532.1.

532.20 General Items

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Porcelain Ware. Manufacture, color, grinding requirements, dimensional tolerance, glazing requirements, allowable sizes of cracks, crowfeet, and discolored spots.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Vitreous Ware. Manufacture, color, grinding requirements, minimum thickness, dimensional tolerance, allowable warpage, glazing quality requirements, and red ink absorption test requirements.

532.21 Crucibles and Laboratory Porcelain Ware

American Chemical Society. Standard Sizes and Shapes of Apparatus; 1927. Includes dishes and crucibles, sizes and capacities selected as standard stock items, no detailed dimensions or specifications.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Laboratory Porcelain Ware. Requirements on general quality, tolerance on capacity, test requirements for resistance to rapid heating and cooling, resistance to hot alkalies, freedom from porous surface, softening at high temperatures, standard sizes and dimensions for annealing cups, boats, casseroles, combustion capsules, high and low form crucibles and crucible covers, dishes, buchner funnels, gooch crucibles and covers, perforated plates for funnels, plates for color reactions, long spatula with knob, dupont nitrometer, requirements on surfaces to be glazed.

References.—Methods of sampling and of testing clay and clay products. *See also* 531.0. Other laboratory apparatus. *See* 918.

532.22 Porcelain for Electrical Purposes

American Electric Railway Engr. Assn. Recommended Specification. D102–29; 1929. Overhead Line Material for Direct and Catenary Suspension. Includes porcelain strain, feeder, and messenger insulators, requirements on dimensions and general design of 4 sizes of strain type insulators, and of 2 sizes of feeder pin type insulators, and of 1 size of messenger insulator, general quality of porcelain, flashover and leakage tests for the feeder insulators.

American Institute of Electrical Engineers. Standard No. 41; 1930. Approved by American Standards Assn. as C29a–1930. Insulator Tests. Definitions, methods of making design and routine tests for both pin and suspension type insulators, including dry and wet flashover tests, corona and puncture tests, thermal and porosity tests. The 1925 edition available in Spanish from Bur. of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Railway Assn. Electrical Section. IX–a–26; 1926. Porcelain Insulators for Railroad Supply Lines. For pin type and for suspension type insulators, requirements on ratio of flashover voltage to puncture voltage, general quality of porcelain and of glaze, type of hardware, assembly of insulators, flashover and mechanical strength tests, methods of testing as specified by Am. Inst. of Elec. Engrs.

American Railway Assn. Signal Section. 14428; 1928. Porcelain Insulation. Dry process porcelain for terminal blocks and switch mountings, general quality requirements, dimension tolerance, absorption test requirements.

American Railway Assn. Signal Section. 14631; 1931. Pin Type Porcelain Insulators. For signal purposes for all voltage ranges, requirements on general physical qualities, tolerance on dimensions, strength, and permissible porosity, methods of conducting dry and wet flashover tests, corona formation test, and puncture test.

American Railway Assn. Telegraph and Telephone Section. 2–G–14; 1924. Porcelain Filler Button, ARA–3–A. For use with porcelain jack panel ARA–4–B, general quality and water absorption test requirements, dimensions.

American Railway Assn. Telegraph and Telephone Section. 2–G–9; 1924. Porcelain Jack Panel ARA–4–B. Panel for mounting 16 jacks on switchboard frame, insulation resistance test and absorption of water test requirements for porcelain panel, color of glaze, dimensions.

American Railway Assn. Telegraph and Telephone Section. 2–G–5; 1924, and 2–G–6; 1924. Fuse Block ARA–1–A and ARA–2–A. For porcelain bases, general quality and absorption test requirements.

American Society for Testing Materials. D 116–30; 1930. Methods of Testing Electrical Porcelain. For wet process, cast, and dry process porcelain, dimensions and design of test specimens and specimen test grips, test procedure for tensile strength, compressive and transverse strength, resistance to impact, dielectric strength, effect of heat, porosity, requirements for apparatus.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Wiring Methods. Includes cleats, knobs and tubes, dimensions for various wire sizes.

National Electric Light Assn. Suggested Specifications. D510–23; 1923. Side Groove Pin Insulator. D511–23; 1923. Top Groove Pin Insulator. For porcelain insulators, dimensions and permissible variations, minimum wall thickness, threading, requirements on dry arc over value, for wet process porcelain, brown glazed finish. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specification. D560–23; 1923. Guy Strain Insulator. For 3 sizes of wet-process porcelain strain insulators, dimensions and allowable variations, strength requirements for compression, brown glaze finish. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications. D580–23; 1923. Spool Insulator (Small Type). D581–23; 1923. Spool Insulator (Large Type). Dimensions and allowable variations for one size of each, of brown glazed porcelain. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications. D990–28T; 1928. Tentative. 1-inch and 1⅜-inch Thread in Insulator. For 4 threads per inch, detail dimensions.

National Electric Light Assn. Suggested Specifications. D900–28T; 1928. Tentative. Wireholder. For brown glazed wet-process porcelain wire holder on wood screw, dimensions and allowable variations for one size.

National Electric Light Assn. Suggested Specifications. D570–28T; 1928. Tentative. Multifin Guy Strain Insulator. Material brown glazed, wet-process porcelain, dimensions and allowable variations for 3 sizes.

National Electrical Mfrs. Assn. Publ. No. 31–10. 1931 Switchgear Standards. SG8–33 and SG8–34. Outdoor Insulator Units. Requirements on parallelism of top and bottom surfaces, standard bolt and bolt circle assemblies, standard heights of 3-inch bolt circle insulator units, tolerances.

Underwriters' Laboratories. Cleats, Knobs and Tubes; 1920. Supporting insulators for low potential wiring, general design, properties of materials, standard dimensions of various sizes, dimensioned drawings.

U. S. Gov., Dept. of Commerce. Bureau of Standards. H10; 1927. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the

Installation and Maintenance of Electrical Supply and Communication Lines. For line insulators for grade A or B construction, requirements for wet porcelain insulators for voltages of 2,300 or above, including ratio of flashover to puncture voltages, dry flashover test requirements for insulators for various voltage applications.

U. S. Gov., Dept. of Commerce. Bureau of Standards R73; 1927. One-Piece Porcelain Insulators. Simplified practice recommended and accepted by industry establishing a limited list of standard designs and shapes of one-piece porcelain insulators, designated by the various manufacturers' catalogue numbers.

References.—Methods of sampling and of testing clay and clay products. *See also* 531.0. Other electrical insulating materials and methods of testing. *See* 719.5. Thread gauges for insulators. *See* 615.82. Glass insulators. *See* 526.1. Rosettes for electrical wiring. *See* 715.23. Electrical panels and switchboards. *See also* 714.4. Telephone switchboards. *See also* 718.22. Fuse blocks, cut-out bases. *See* 714.22, 719.71. Switches, sockets, receptacles. *See* 714.52, 715.21, 715.22. Porcelain terminal blocks. *See* 718.29. Strain insulators and cap and cone insulators for trolley line support. *See* 719.63.

532.23 Tubs, Sinks, Water-closets, and Lavatories

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes. Plumbing; 1926. Regulations for installation of plumbing fixtures, minimum sizes of water supply pipes, of waste pipes, and of vent pipes, drawings showing principal dimensions of typical plumbing fixtures with location of inlet and outlet pipes, for lavatories, closets, urinals, drinking fountains, and slop sinks.

American Water Works Assn. Water Works Practice Manual; 1925. Sanitary Drinking Fountains, Specifications. Requirements on use of slanting jets, protection of orifices and orifice guards.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS4–29; 1929. Staple Porcelain (All-Clay) Plumbing Fixtures. Shower Receptor. A commercial standard selected and accepted by industry, standard sizes and main dimensions, permissible amounts and location of blemishes in regular selection grade, method of grading.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS4–29; 1929. Staple Porcelain (All-Clay) Plumbing Fixtures. Bath Tubs. A commercial standard selected and accepted by industry, standard types and main dimensions, permissible amounts and location of blemishes in regular selection grade, method of grading.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS4–29; 1929. Staple Porcelain (All-Clay) Plumbing Fixtures. Lavatories. A commercial standard selected and accepted by industry, standard types and main dimensions, permissible amounts and location of blemishes in regular selection grade, method of grading, for leg types and pedestal types.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS4–29; 1929. Staple Porcelain (All-Clay) Plumbing Fixtures. Laundry Trays. A commercial standard selected and accepted by industry, standard types and main dimensions, permissible amounts and location of blemishes in regular selection grade, method of grading, covering roll rim and flat rim laundry trays and combination sink and laundry trays.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS4–29; 1929. Staple Porcelain (All-Clay) Plumbing Fixtures. Sinks. A commercial standard selected and accepted by industry, standard types with main dimensions, permissible amount and location of blemishes in regular selection grade, method of grading, covering kitchen sinks, slop sinks, combination sink and laundry tray.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS4–29; 1929. Staple Porcelain (All-Clay) Plumbing Fixtures. Stall Urinals. A commercial standard selected and accepted by industry, covers main dimensions of standard types, permissible amount and location of blemishes in regular selection grade, method of grading.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS20–30; 1930. Staple Vitreous China Plumbing Fixtures. Urinals. A commercial standard selected and accepted by industry for stall and pedestal type urinals, covering nomenclature, definitions, grading rules, types, sizes, and main dimensions for regular selection and culls, graded according to amount and location of blemishes, requirements on red ink test for vitreous china, depth of water seal.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS20–30; 1930. Staple Vitreous China Plumbing Fixtures. Lavatories, Pedestals, and Legs. A commercial standard selected and accepted by industry, covering nomenclature, definitions, grading rules, types, sizes, and main dimensions for regular selection and culls graded according to amount and location of blemishes and warpage, red ink test for vitreous china.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS20–30; 1930. Staple Vitreous China Plumbing Fixtures. Water-Closet Bowls and Tanks. A commercial standard selected and accepted by industry, covering nomenclature, definitions, grading rules, types, sizes, and main dimensions, for 2 grades, regular selection and culls, graded according to amount and location of blemishes, requirements on depth of water seal, red ink test for vitreous china.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS29–31; 1931. Staple Seats for Water-Closet Bowls. A commercial standard selected and accepted by industry establishing standard types and finishes for varnished seats, sprayed seats, sheet covered seats, hard rubber seats, and molded composition sheets, permissible defects in wood and size of doweling in wood seats, requirements on thickness of shell or covering for molded seats, thickness of covering and standard colors for sprayed finish and sheet covered seats, standard types, weights, dimensions, spacing, and material of hinges.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS30–31; 1931. Colors for Colored Sanitary Wear. A commercial standard selected and accepted by industry establishing 6 standard colors for colored sanitary wear, standard samples being kept at the Bureau of Standards, requirements on procedure for making color comparisons with sample. Applicable to plumbing fixtures and allied products.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R106–30; 1930. Hospital Plumbing Fixtures. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes and types of baby baths, receiving baths, prenatal baths, seat baths, continuous flow baths, portable baths, surgeon's lavatory, instrument washing lavatory, narrow lavatory, surgeon's wash-up sinks, service washing sinks and trays, medicine sinks, syphon jet slop sink, pack sinks, massage table, and autopsy table, materials vitreous china or porcelain for most of the items, conforming to commercial standards CS20–30 and CS4–29 of Nat. Bur. of Standards as to quality.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Vitreous Urinal Stall. Quality requirements and tests for vitreous ware and glazing, minimum thicknesses, tolerances and warpage of vitreous ware, dimensions and construction requirements for stall and vitreous tank. Urinal outfits comprising stall with tank and stall with flushing valve.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Water-Closet Bowl. Vitreous ware, wash-down siphon type with molded-in trap. Quality requirements and tests for vitreous ware and glazing, minimum thicknesses, tolerances and warpage allowed, dimensions and construction requirements for bowl, for vitreous low tank, and for wooden seat. Two water-closet outfits, tank outfit and flushing valve outfit respectively.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Porcelain Urinal Stall. For porcelain composed of glazed vitreous coating over fire-clay body, quality requirements for porcelain and glaze, dimensions and construction requirements for stall and vitreous tank. Urinal outfits comprising stall with tank and stall with flushing valve.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Vitreous Lavatories. For concealed hanger supported, rectangular and corner lavatory, quality requirements and tests for vitreous ware and glazing, construction and tolerances, list of accessories for lavatories.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Water-Closet Bowl. Vitreous ware, siphon jet type with molded-in trap. Quality requirements and tests for vitreous ware and glazing, minimum thicknesses, tolerances and warpage of vitreous ware, dimensions and construction requirements for bowl, for vitreous high or low tank, for composition seat without cover. Water-closet outfits comprising various combinations of regular bowl and extended lip bowl with high tank, low tank, or flush valve.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Vitreous Slop Sink. Quality requirements and tests for vitreous ware, dimensions and illustrated design for slop sink and supporting 3-inch trap standard, connections of cast iron trap, dimensions and construction of water supplies and rim guard.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Vitreous Lavatories. For leg supported, rectangular and corner lavatory, quality requirements and tests for vitreous ware and glazing, construction, dimensions and tolerance, list of accessories for lavatories for two bowl sizes.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Porcelain Laundry Trays. For one-piece porcelain tray supported from floor, general dimensions and construction of tray and wringer base, quality of porcelain, sizes and types of fittings for supply and waste.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Vitreous Barrack Lavatories. For wall support or for support on cast-iron standards from floor as illustrated. Quality requirements and test for vitreous ware and glazing, dimensions and construction of lavatories.

References.—Methods of sampling and of testing clay and clay products. *See also* 531.0. Grinding and general quality of porcelain ware and vitreous ware. *See also* 532.20. Plumbing symbols and plumbing practice. *See also* 600.6. Metal bath tubs, water closets, and sinks. *See* 612.21, 612.23.

532.9 MISCELLANEOUS CHINA AND PORCELAIN WARE

References.—Glazed tile and mosaic. *See* 534.25.

533. EARTHENWARE AND STONEWARE

533.1 BOWLS

533.2 CROCKERY

533.3 POTS

534. BRICKS AND TILE

References.—Sand lime brick. *See* 513. Concrete brick. *See* 516.4. Asphalt block. *See* 518.37.

534.1 BRICKS

534.10 General Items

American Assn. of State Highway Officials. Tentative Method. T–31. Undated. Method of Sampling and Testing Paving Brick. Same as C 7–30 of Am. Soc. for Testing Materials, sections 11, 12, 17 to 29.

American Assn. of State Highway Officials. Tentative Method. T–32. Undated. Methods of Testing Brick. Same as C 67–30T of Am. Soc. for Testing Materials.

American Ceramic Society. Journal of A. C. S. for June, 1928. Method of Testing for Pyrometric Cone Equivalent; 1928. Applicable to fire brick, refractory materials and clays. Requirements on sampling, size, shape and preparation of test cones, rate of heating and method for determination of softening point.

American Society of Mechanical Engineers. Power Test Codes. Instruments and Apparatus, Part 3. Temperature Measurement; 1931. Includes Pyrometric Cones. Description, classification, and use of pyrometric cones, advantages and disadvantages of their use, range and accuracy, preparation for and making of test, corrections and calibration of cones.

American Society of Municipal Engineers. Brick Pavements; 1922. Includes rattler test of brick, materials, dimensions and construction of barrel, staves, and frame; number, dimensions, weight, and chemical composition requirements for two sizes of cast iron spheres forming the abrasive charge, speed of revolution, and number of revolutions in standard test.

American Society for Testing Materials. C 16–20; 1920. Method of Test for Refractory Materials Under Load at High Temperatures. Construction and dimensions of furnace and loading device, size of test specimen, amount of loading for end applied load, heating schedule, measurement of change of dimensions.

American Society for Testing Materials. C 18–21; 1921. Methods of Chemical Analysis of Refractory Materials, Including Chrome Ores and Chrome Brick. Preparation and strength requirements of reagents, determination of moisture, loss on ignition, percentage of silica, alumina, iron oxide, titania, lime, magnesia, and alkalies for general refractories, additional methods for determination of chromium in chrome ores and chrome brick.

American Society for Testing Materials. Tentative Specifications. C 19–26T; 1926. Approved as tentative by American Standards Assn. under designation A 2–1926. Nat. Bureau of Standards and A. S. A. Fire Protection Group joint sponsors with A. S. T. M. on this project. Fire Tests of Building Construction and Materials. For determining performance during exposure to fire and not for suitability for use after exposure, standard time temperature curve for regulation fire test, fire endurance test requirements and fire stream test where specified for floors, roofs, walls, columns and partitions.

American Society for Testing Materials. C 20–20; 1920. Method of Test for Porosity and Permanent Volume Changes in Refractory Materials. Cutting of brick specimens, burning procedure with schedule of temperatures, drying and weighing of sample in air and in kerosene, determination of true specific gravity from powdered sample, calculation of volume shrinkage of brick and of volume of open and sealed pores.

American Society for Testing Materials. C 24–31; 1931. Method of Test for Softening Point of Fire Clay Brick. Preparation and dimensions of sample and of test cones, test procedure for softening point by comparison with standard Orton pyrometric cones.

American Society for Testing Materials. Tentative Standard. C 38–31T; 1931. Method of Control Test for Resistance of Fire Clay Brick to Thermal Spalling Action. Requirements on standard size of sample, test procedure for repeated rapid heating and cooling through prescribed cycle of temperatures and time intervals and obtaining loss by spalling.

American Society for Testing Materials. C 67–31; 1931. Methods of Testing Brick. Preparation of specimen, requirements for testing apparatus, and test procedure for compression test, flexure or cross-bending test, and absorption test.

American Society for Testing Materials. C 71–28 and C 71–31 T; 1931. Definitions of Terms Relating to Refractories. Standard definitions of fire clay, plastic fire clay, diaspore clay, nodular fire clay, spalling, pyrometric cone equivalent, and of heat transmission terms.

U. S. Gov., Dept. of Commerce. Bureau of Standards LC 266; 1929. Portable Testing Machine for Making Transverse Tests of Building Bricks. Requirements on general design features, dimensions of knife edge, weight, capacity, and accuracy for manually operated machine.

534.11 Face, Common, and Vitrified Brick

American Face Brick Assn. Standard Grading Rules for Face Brick; 1931. For uniform shade, mingled shade, substandard, and cull, requirements as to dimensional variations, warpage, chippage, and color, definitions, test methods.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Railway Buildings, sec. 21. Brick Pavements and Floors. For paving brick, requirements on general quality, permissible kiln marks, standard size, straightness of straight side, permissible loss on rattler test, to conform to Spec. C–7 of Am. Soc. for Testing Materials on paving brick.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes. Brickwork; 1926. For common brick, requirements on general quality, permissible water absorption.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes. Sewers and Drainage; 1926. For brick for sewers, requirements on general quality, permissible water absorption.

American Society of Municipal Engineers. Sewers; 1927. Includes common brick and vitrified brick used in construction of sewers, general quality, permissible variations in dimensions, and absorption test requirements for common brick, with transverse and crushing tests where specified. General quality, loss on rattler test, and absorption test requirements for vitrified brick.

American Society of Municipal Engineers. Vitrified Brick Pavements; 1930. Includes vitrified paving brick, requirements on general quality, dimensions and design of repressed or wire cut lug brick and of plain wire cut brick, with or without lugs, permissible variations in dimensions, permissible bulge, rattler test in accordance with A. S. T. M. methods.

American Society for Testing Materials. C 7–30; 1930. Paving Brick. Covers vitrified brick made from fire clay, semifire clay or shale, general quality, sizes and dimensions of lug, repressed and bevel end bricks, permissible loss on rattler test for various sizes, construction, materials and design of rattler and abrasive charge, rattler test procedure.

American Society for Testing Materials. C 32–24; 1924. Clay Sewer Brick. For medium brick, hard brick, and two grades of vitrified brick, dimensions, absorption, compression and transverse strength test requirements.

American Society for Testing Materials. C 62–30; 1930. Building Brick (Made from Clay or Shale). For 3 grades of bricks dependent on strength, compressive strength, and modulus of rupture requirements using A. S. T. M. method of test C 67, standard size of common brick, rough-face brick, and of smooth-face brick.

U. S. Gov., Dept. of Commerce. Bureau of Standards R1–29; 1929. Vitrified Paving Brick. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes, dimensions, and types for plain wire cut, wire cut lug brick, and repressed lug brick.

U. S. Gov., Dept. of Commerce. Bureau of Standards R7; 1923. Face Brick and Common Brick. Simplified practice recommended and accepted by industry establishing one standard size for common brick and rough face brick and one standard size for smooth face brick, approximate dimensions.

U. S. Gov., Dept. of Commerce. Bureau of Standards BH 1; 1923. Recommended Minimum Requirements for Small Dwelling Construction. For brick used in 8-inch walls, recommendations of the building code committee on requirements for absorption limits, compressive strength, and modulus of rupture, for face brick and for common brick. Less severe requirements than those of Am. Soc. for Testing Materials for medium brick.

U. S. Gov., Federal Specifications Board. 504; 1927. Common Clay Brick. For vitrified and 3 other hardness grades, requirements on general quality, standard size, variations permitted in dimensions, absorption, and transverse strength, methods of test.

U. S. Gov., Federal Specifications Board. SS–B–671; 1930. Paving Brick. For plain wire cut, wire cut lug, and repressed lug types, made of fire clay, semifire clay or shale, requirements on dimensions, freedom from defects, permissible loss by abrasion test, using methods of test C 7–29T of Am. Soc. for Testing Materials.

References.—Definitions, methods of sampling and of testing brick. *See also* 500., 534.10. Methods of sampling and testing clay and clay products. *See also* 531.0. Sand lime brick. *See* 513. Brick in building construction. *See* 518.5. Brick in drainage structures. *See* 518.6. Brick in construction of tanks, pools. *See* 518.7. Brick masonry. *See* 518.83. Brick in bridge construction. *See* 518.4. Brick pavements. *See* 518.35.

534.12 Fire Brick and Tiles, and Fire Clay Brick

American Foundrymen's Assn. Recommended Tentative Standards. Malleable Refractories; 1927. Recommends 24 standard sizes of refractories for malleable industry, drawings and dimensions of door opening tiles, tap-out blocks, shapes for side walls, bridge walls, etc., shapes for bungs, shapes for stacks.

American Marine Standards Committee. E No. 13–1927. Fire-Clay Refractories for Marine Service. Test requirements for grades of fire clay brick, fire clay, and plastic refractory, including composition, softening point, quenching, load, etc.

American Marine Standards Committee. E No. 33–1930. Insulating Brick and Mortar. For 2 grades of brick and mortar for temperatures up to 2,500° F., requirements on dimensions, weight, conductivity, and softening point of brick, on fineness, plastic qualities, bonding properties under heating test, and softening temperatures of mortar, methods of test, nonshrinkage requirements.

American Society for Testing Materials. C 27–28; 1928. Definitions for Clay Refractories. Softening point requirements for bricks of various heat duties, for clay fire brick and siliceous clay fire brick.

American Society for Testing Materials. C 63–28; 1928. Clay Fire Brick for Malleable Furnaces with Removable Bungs and for Annealing Ovens. Requirements on silica content, softening point, spalling, modulus of rupture, using A. S. T. M. test methods C 18, C 24, C 38–27T, and C 67–28T, respectively, test requirements for linear contraction, values of above items dependent on location of brick in furnace, size tolerance.

American Society for Testing Materials. C 64–28; 1928. Clay Fire Brick for Stationary Boiler Service. Size tolerance, requirements on silica content, softening point, spalling, modulus of rupture, and deformation according to A. S. T. M. methods of test C 18, C 24, C 38–27T, C 67–28T, and C 16, respectively, test requirements for absorption and linear contraction, tests and test values dependent on location of brick in furnace.

American Society for Testing Materials. C 65–28; 1928. Clay Fire Brick for Marine Boiler Service. Requirements on size tolerance, silica content, softening point, spalling, and deformation under load according to A. S. T. M. test methods C 18, C 24, C 38–27T, and C 16, respectively, linear contraction test, requirements dependent on location of brick in furnace.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R79–28; 1928. Malleable Foundry Refractories. Simplified practice recommended and accepted by industry establishing a limited list of standard stock shapes and sizes of brick and tile for malleable foundry refractories, including door opening tile, tap-out blocks, shapes for side walls, bridge walls, bungs, roofs, and round stacks.

U. S. Gov., Dept. of Commerce. Bureau of Standards. T116; 1919. Silica Refractories (silica brick). Factors affecting their quality and methods of testing the raw materials and finished ware. Includes recommendations on inspection of raw materials, content of SiO_2, degree of softening on heating, specific gravity, expansion on heating, transverse test on cold brick, and load test on hot brick.

U. S. Gov., Federal Specifications Board. HH–B–671; 1930. Fire Clay Brick. For 6 classes of brick dependent on severity of service as regards temperature, loading, abrasion, resistance to spalling, etc., requirements on softening point, quenching test, percentage silica, absorption, deformation under load, methods of sampling and test.

U. S. Gov., Federal Specifications Board. SS–R–191; 1930. Plastic Fire Clay Refactories. For a mixture of grog, raw clay, and water, requirements on silica content, softening point, water content, dry and burned shrinkage, methods of sampling and test.

References.—Definitions, methods of sampling and of testing of brick. *See also* 534.10. Methods of sampling and of testing of clay and clay products. *See also* 531.0. Fire clay paving brick. *See* 534.11.

534.2 TILE

References.—Clay pipe and conduit. *See also* 531.5. Refractory tiles for foundries. *See* 534.12. Concrete building tile. *See* 516.4. Concrete drain tile and pipe, culvert pipe, and sewer pipe. *See* 518.62, 518.61, 518.67.

534.20 General Items

American Society for Testing Materials. C 43–31; 1931. Definitions of Terms Relating to Structural Clay Tile. Definitions of terms relating to hollow building units with parallel cells.

Associated Tile Manufacturers. K–300; 1924. Tilework and Related Documents. Basic specifications for installation of tilework, including preparation of surfaces, setting of tile, etc., for general and for special applications.

534.21 Drainage Tile

American Assn. of State Highway Officials. Tentative Method. T–34. Undated. Method of Sampling and Testing Drain Tile. Same as C4–24 of Am. Soc. for Testing Materials Sections 8 to 30 except that the preliminary wetting of the tile for the compression test may be omitted in routine testing in T–34.

American Society of Municipal Engineers. Sewers; 1927. Includes two-ring and one-ring segmental tile blocks, general quality, thicknesses and limiting dimensions for various sizes of sewers.

American Society for Testing Materials. C 4–24; 1924. Joint sponsor with U. S. Dept. of Agriculture, approved by American Standards Assn. as A 6–1925. Drain Tile. Covers farm, standard, and extra quality drain tile of concrete or of clay, disallowed materials in chemical composition, requirements on crushing strength and absorption test, visual inspection, and where specified, freezing and thawing test requirements.

References.—Methods of sampling and of testing clay and clay products. *See also* 531.0. Concrete drain tile and pipe, culvert pipe, and sewer pipe. *See* 518.62, 518.61, 518.67.

534.22 Hollow Building Tile

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes. Includes Clay Hollow Tile; 1926. Absorption and load bearing capacity for load bearing tile, finished face tile, and vitrified foundation tile, general requirements on their installation in building construction.

American Society for Testing Materials. C 34–31; 1931. Structural Clay Load-Bearing Wall Tile. For 3 classes, requirements on hardness, absorption and compression tests, freezing and thawing tests, for tile for end construction and for side construction.

American Society for Testing Materials. C 56–31; 1931. Structural Clay Fireproofing Partition and Furring Tile. For hard, medium, and soft grades, test requirements for absorption and dry weight, permissible variations in weight and dimensions.

American Society for Testing Materials. C 57–31; 1931. Structural Clay Floor Tile. For 3 classes, requirements on general quality, hardness, weight, absorption and compressive strength tests.

U. S. Gov., Dept. of Commerce. Bureau of Standards R12; 1926. Hollow Building Tile. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes of load bearing wall tile, partition tile, split furring tile, and book tile, giving overall dimensions, number of cells, and weight of each.

U. S. Gov., Dept. of Commerce. Bureau of Standards BH 1; 1923. Recommended Minimum Requirements for Small Dwelling Construction. For hollow building tile, recommendations of building code committee on requirements on compressive strength for tile used in exterior or party walls for vertical cell construction and for horizontal cell construction.

U. S. Gov., Federal Specifications Board. 506; 1927. Hollow Clay Floor Tile. For medium and soft grades, requirements on general quality, tolerance on dimensions, weights of various sizes of flat arch, segmental arch, and tile for use in combination tile and concrete construction, absorption. compressive strength where called for, methods of test.

U. S. Gov., Federal Specifications Board. 507; 1927. Hollow Clay Tile, Load Bearing Wall Type. For 3 grades of hardness, requirements on general quality, tolerance on dimensions, weights of various sizes, absorption, compressive strength where called for, methods of sampling and test.

U. S. Gov., Federal Specifications Board. 508; 1927. Hollow Clay Tile, Fireproofing, Partition, and Furring. For medium and soft grades, requirements on tolerance on dimensions, weights of various sizes, absorption, compressive strength where called for, methods of sampling and test.

References.—Methods of sampling and of testing clay and clay products. *See also* 531.0. Definitions. *See also* 534.20. Fire tests. *See also* 534.10. Use in building construction. *See* 518.5. Gypsum building tile. *See* 514.62. Concrete building tile and blocks. *See* 516.4.

534.23 Roof Tiles

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Clay Roofing Tile; 1926. Tile to be natural color, hard burned, and true in shape to agree with sample submitted, general requirements for laying in roof.

Clay Products Institute of California. Strength Tests for Roofing Tiles. Undated. Requirements on procedure for transverse strength testing of roofing tiles, recommendations for permissible absorption, and transverse strength under the specified conditions of test.

Eastern Clay Products Assn. Standards; 1928. Salt Glazed Vitrified Wall Coping. Standard dimensions of double slant and camel back wall coping, straight sections and corners.

References.—Methods of sampling and of testing clay and clay products. *See also* 531.0. Fire tests. *See also* 534.10. Concrete roofing tile. *See* 516.4. Use in building construction. *See* 518.5.

534.24 Terra Cotta

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes. Architectural Terra Cotta; 1926. Compressive strength, uniform fracture, and scratch resistance requirements, general requirements on use in building construction.

National Terra Cotta Society. Manufacture, Furnishing and Setting of Terra Cotta; 1923. Includes requirements on minimum thickness of walls and partitions and depth of beds, on provision of washes, drips, weep holes, adaptability to flashings, on dimensions and protection of supports and anchors, on setting and pointing, etc., glossary of terms.

References.—Methods of sampling and of testing clay and clay products. *See also* 531.0. Terra cotta in building construction. *See also* 518.51.

534.25 Glazed Tile and Mosaic

Associated Tile Manufacturers. K–300; 1924. Tilework and Related Documents. Basic specifications for installation. *See* 534.20.

Associated Tile Manufacturers. K–400; 1921. Glazed Tiles and Trimmers. Standardized Shapes and Sizes. Sizes of glazed tiles, method of numbering, definition of letter symbols, dimensions and design of quarter rounds and coves, small and large radius combinations, bases, caps, architraves, plinths, mouldings, illustrations of types and illustrations of typical uses.

Associated Tile Manufacturers. Tile Bathrooms and Tiled Floors or Wainscots; 1920. General requirements for sand, cinders, crushed stone, size of tile, preparation of foundation and setting floor tile, preparation of scratch coat and setting of wall tile.

U. S. Gov., Dept. of Commerce. Bureau of Standards R61–30; 1930. Clay Tiles for Floors and Walls. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes, shapes, and grades of glazed tiles and ceramic mosaic, including overall dimensions of the standard sizes, definition of grades, permissible warpage, wedging, crooked edge, spots, blots, and other defects for 2 grades each of white glazed and of colored glazed tiles, capacity of shipping containers.

References.—Methods of sampling and of testing clay and clay products. *See also* 531.0. Installation and standard sizes. *See also* 534.20. Building construction. *See* 518.5.

534.29 Miscellaneous Specifications for Tile

American Electric Railway Engr. Assn. D200–29; 1929. Specification and Form of Contract for Electrical Conduit Construction. Includes single tile duct, requirements on length, minimum bore, structural features, glazing, alignment, permissible cracks and blisters, absorption test.

Eastern Clay Products Assn. Standards; 1928. Fire Clay Flue Linings and Fittings. Stove Pipe and Fittings. Dimensions of standard sizes of rectangular and round flue linings (unglazed) and of round stove pipe and fittings.

Eastern Clay Products Assn. Salt Glazed Vitrified Clay Liner Plates. Undated. For use in lining sewers, requirements on dimensions, glazing surface, provision of key for mortar or concrete, for curved or flat plates.

References.—Methods of sampling and of testing clay and clay products. *See also* 531.0. Chimneys. *See* 518.55. Sewers. *See* 518.67.

540–549 ABRASIVE MATERIALS, ASBESTOS, AND CHALK

541. ABRASIVES, NATURAL AND ARTIFICIAL

541.0 GENERAL ITEMS

Grinding Wheel Mfrs. Assn. of the U. S. and Canada. Standard Grain Sizes; 1930. Allowable limits for the sizing of aluminum oxide and silicon carbide abrasives for polishing uses and for grinding wheel manufacture but not applicable to abrasives used in the manufacture of abrasive papers and cloths, grading by standard screens for 19 grit sizes.

U. S. Gov., Dept. of Commerce. Bureau of Standards R118–30; 1930. Abrasive Grain Sizes. Simplified practice recommended and accepted by industry covering electric furnace abrasives (not for use in manufacture of abrasive cloth and paper). Definitions of 19 grades as regards screen grading for aluminum oxide and silicon carbide abrasives for polishing uses and grinding wheel manufacture, list of manufacturers from which standard samples may be obtained.

541.1 FLINT

References.—Flint coated abrasive products. *See* 541.4.

541.2 HONES, WHETSTONES, AND OILSTONES

References.—Abrasive grain sizes. *See* 541.0.

541.3 ABRASIVE WHEELS

Grinding Wheel Manufacturers Assn. of U. S. and Canada, International Assn. of Industrial Accident Boards and Commissions. Approved by American Standards Assn. as B 7–1930. Safety Code for the Use, Care and Protection of Abrasive Wheels. Requirements on size of spindles, direction and length of spindle thread, size of wheel holes, angle of exposure, materials, dimensions and design of protection hoods, dimensions of flanges, mounting of wheel, permissible speeds, operating rules.

Grinding Wheel Mfrs. Assn. of the U. S. and Canada. Standard Blotter Sizes; 1926. Standard blotter diameters and hole sizes applicable to various sizes of grinding wheels of straight and tapered sides.

Grinding Wheel Mfrs. Assn. of the U. S. and Canada. Standard Steel Center Coping Wheels; 1929. Standard design, dimensions, and tolerances for 10 sizes of wheels from 10 to 36 inches.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Crankshaft Grinding Wheels; 1920. 15 sizes of grinding wheels according to width, radii of edges.

U. S. Gov., Dept. of Commerce. Bureau of Standards R45–28; 1928. Grinding Wheels. Simplified practice recommended and accepted by industry establishing a limited list of standard types, sizes, and dimensions of grinding wheels, covering straight, tapered 2 sides, cylinder, recessed one side, recessed 2 sides, straight cup, flaring cup, dish, and saucer types, standard nomenclature for various classes of grinding work.

References.—Dental grinding wheels. *See also* 915.10. Electric buffers and grinders. *See* 711.24. Abrasive grain sizes. *See* 541.0.

541.4 ABRASIVE CLOTHS AND PAPERS

Abrasive Paper and Cloth Manufacturers Exchange. Abrasive Coated Products; 1929. Requirements on method of hand analysis of abrasive sands, grade name and screen grading of abrasive, weight and tensile strength of cloth or paper backing, grades, closed or open coating, kind of backing, size of sheet, and weight for flint, emery cloth, crocus cloth, garnet, chalk, flint, aluminum oxide, silicon carbide, in reams and in rolls, standard packing.

U. S. Gov., Dept. of Commerce. Bureau of Standards R89–28; 1928. Coated Abrasive Products. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes and varieties of coated paper and coated cloth abrasives, covering types, weight of paper or type of cloth backing, sizes, coverage of coating, and fineness of abrasive material.

U. S. Gov., Federal Specifications Board. 385b; 1929. Flint Paper. For ream flint paper and roll flint paper, requirements on commercial grain sizes covered, size of grain to agree with the standard sample, general quality of abrasive, size of sheets and of rolls, weight, tensile strength and kind of paper in backing, packing.

U. S. Gov., Federal Specifications Board. 386a; 1928. Garnet Paper. Requirements on commercial grain sizes covered, general quality of abrasive, size of sheets, length of roll, weight strength, and kind of paper used for backing, packing, grain size to agree with standard sample.

U. S. Gov., Federal Specifications Board. 387b; 1929. Aluminum Oxide Abrasive Cloth. For sheets, requirements on size of sheet, weave, weight, strength, and width of backing cloth, general quality of abrasive, commercial grading numbers covered, grain size to agree with standard sample, packing, methods of test.

U. S. Gov., Federal Specifications Board. 388b; 1929. Emery Cloth. For sheets, requirements on size of sheets, weave, width, weight, and tensile strength of cloth, general quality of abrasive, commercial sizes covered, grain size to agree with standard sample, packing, methods of test.

U. S. Gov., Federal Specifications Board. 582; 1928. Waterproof Artificial Abrasive Paper. Requirements on size, weight of paper backing, abrasive silicon carbide or aluminum oxide, commercial designation for grain size, tensile strength, standard packaging, equal to standard sample as regards quality and adhesion of grain as shown by comparative test.

U. S. Gov., Federal Specifications Board. 583; 1928. Waterproof Garnet Paper. Requirements on sheet size, weight and type of paper backing, grain sizes according to commercial designation, strength test, standard packaging, quality of paper and adhesion of grain tested by rubbing with standard sample.

541.5 PUMICE

American Pharmaceutical Assn. National Formulary; 1926. Pumice. For medicinal purposes, description and physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

545. ASBESTOS

545.1 ASBESTOS, UNMANUFACTURED

545.2 ASBESTOS PAPER, MILLBOARD, AND ROLL BOARD

American Marine Standards Committee. E No. 17–1928. Asbestos Millboard. Specifications of material, size, thickness, and weight of millboard, test requirements for loss in weight on heating and for cracking and deflection under load. Substantially identical with that of F. S. B. for the same material.

U. S. Gov., Dept. of Commerce. Bureau of Standards R19–28; 1928. Asbestos Paper and Asbestos Millboard. Simplified practice recommended and accepted by industry establishing a limited list of standard widths and weights of roll and thicknesses of asbestos paper, size of sheet and thicknesses of asbestos millboard.

U. S. Gov., Federal Specifications Board. HH–M–351; 1931 Asbestos Millboard. For medium and hard grades, requirements on permissible vegetable matter, standard dimensions, thicknesses and tolerances, weight, behavior on heating, loss on heating, and transverse test requirements.

545.3 ASBESTOS PIPE COVERING AND CEMENTS

References.—Asbestos pipe covering. *See* 707.42.

545.4 ASBESTOS TEXTILES, YARNS, AND PACKING

American Marine Standards Committtee. E No. 14–1928. Insulation of Piping and Machinery on Ships. Includes asbestos cloth, pure and commercially pure grades, weight, carbon content, twist of yarn, number of threads and weave requirements.

American Society for Testing Materials. D 299–29. Tolerances and Test Methods for Asbestos Yarns. Definitions, nominal yardage and permissible variation for various yarn cuts, tolerance on size of wire in metallic asbestos yarn, cotton content and method of determination for 4 grades of plain asbestos yarn and of metallic asbestos yarn.

U. S. Gov., Federal Specifications Board. HH–P–31; 1931. Asbestos Metallic Cloth Sheet Packing. Covers 2 grades for steam pressures up to 300 pounds, made of woven asbestos wire insertion cloth treated with rubber, requirements on number of plies, bend test, size of brass or copper wire, content of asbestos, weave, weight, amount of rubber, steam pressure test, methods of test in F. S. B. Spec. 59.

U. S. Gov., Federal Specifications Board. HH–P–46; 1930. Compressed Sheet Asbestos Packing. For steam up to 300 pounds, hot or cold water, brine, air, gases of combustion, and fuel oil, for 1 grade of asbestos fiber and rubber mixed, requirements on content of asbestos. tensile strength, tolerance on thickness, methods of test as specified in F. S. B. Spec. ZZ–R–601 for rubber goods.

U. S. Gov., Federal Specifications Board. HH–G–76; 1931. Asbestos Metallic Cloth Gaskets. For steam pressures up to 300 pounds, includes all folded gaskets for boiler manholes, handholes, and flanged joints, covers 2 grades of seamless and of jointed types, of woven asbestos wire insertion cloth treated with rubber, requirements on number of plies, tolerance on thickness, bend test, size of brass or copper wire, content and quality of asbestos, weave, weight of metallic cloth and of rubber, steam pressure test, methods of test as specified in F. S. B. Spec. 59 for rubber goods.

U. S. Gov., Federal Specifications Board. HH–P–41; 1931. Asbestos Wick and Rope Packings. Requirements on percentage of asbestos, water of composition in asbestos, freedom from wire insertions, sizing, and lubrication, minimum unit weights, for ¼-inch wicking and ⅜ to 1¼ inch rope packing.

U. S. Gov., Federal Specifications Board. HH–P–36; 1930. Asbestos High Pressure Rod Packing. For asbestos cloth packing treated with rubber compound, requirements on construction, thread count, content of asbestos fiber and of water in yarn, content of rubber and of sulphur in rubber compound, area of core or spring back, amount of lubricant, steam test, test methods of F. S. B. Spec. 59 for rubber goods.

U. S. Gov., Federal Specifications Board. HH–P–51; 1930. Asbestos Valve Stem Packing. For steam and water pressures up to 300 pounds, also for use with air and fuel oil, for 4 types covering braided asbestos and twisted asbestos types each of which comes in lubricated with oil type and frictioned with rubber type, requirements on construction, percentages of fiber and water in asbestos, amount of lubricant or rubber, testing according to methods of F. S. B. Spec. 59 for rubber goods.

References.—Asbestos electrical tape. *See* 719.51. Asbestos copper gaskets. *See* 707.11. Methods of testing cotton fabrics and yarns. *See* 300.4. 302.10. Methods of testing rubber goods. *See* 200.

545.9 MISCELLANEOUS MANUFACTURES OF ASBESTOS

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Waterproofing and Drainage of Solid Floor Railway Bridges; 1927. Includes asbestos felt, thickness and composition, for asbestos saturated felt, weight, width, moisture content, weight of saturant, loss on heating, strength, conforms closely to A. S. T. M. serial D 173–23T.

American Society for Testing Materials. D 250–27; 1927. Asphalt Saturated Asbestos Felt for Use in Constructing Built-Up Roofs. General quality of asbestos felt, test requirements for degree of saturation, requirements on width, weight, loss on heating, pliability, percentage of saturant, weight and ash of desaturated felt, using A. S. T. M. test methods D 146.

U. S. Gov., Dept. of Commerce. Bureau of Standards R66; 1927. Automobile Brake Lining. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes of brake linings, covering widths and thicknesses.

U. S. Gov., Dept. of Commerce. Bureau of Standards R75–29; 1929. Composition Blackboard. Simplified practice recommended and accepted by industry establishing a limited list of standard stock items covering widths and lengths of black blackboard of cement asbestos backing, of wood-pulp backing, and of gypsum core backing, and green blackboard of wood-pulp backing.

References.—Asphalt and tar roofing. *See also* 505.16. 505.36. Methods of testing saturated roofing felt. *See* 505.0.

546. CHALK

American Ceramic Society. Journal of A. C. S. for June, 1928. Ceramic Whiting; 1924. Definition and use, requirements on general quality, composition and allowable variations, fineness, sampling, recommended methods of analysis.

U. S. Gov., Dept. of Commerce. Bureau of Standards C152; 1923. Ceramic Whiting. Approved by Interdepartmental Conference on Chemical Lime and the Am. Ceramic Society. For the pure calcium carbonate class and the mixed calcium and magnesium carbonates class, requirements on chemical composition, and fineness, methods of sampling and test.

U. S. Pharmacopœial Convention (Inc.). Pharmacopœia of U. S. A.; 1926. Prepared Chalk. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Other calcium carbonate compounds. *See* 833.3.

550–559 MICA, RARE MINERALS

551. CRUDE MICA

552. MANUFACTURED MICA

560–569 PRECIOUS STONES AND IMITATION STONES

560. GENERAL ITEMS

National Jewelers Board of Trade. Recommended Practice. Description of Precious Stones; 1928. Recommended definitions of descriptive terms for precious stones, including genuine, reconstructed, synthetic, doublet, and imitation.

561. DIAMONDS AND PEARLS

National Jewelers Board of Trade. Recommended Practice. Description of Diamonds; 1928. Recommended definitions and rules for use of the descriptive terms perfection, color, cutting, weight unit, and imitations.

National Jewelers Board of Trade. Recommended Practice. Description of Pearls and Imitation Pearls; 1928. Recommended rules for the use of terms pearl, culture pearl, and imitation pearls in advertising and sale of pearls.

562. SAPPHIRES

570–579 SULPHUR, MAGNESIA, SALT, AND GRAPHITE

571. SULPHUR

References.—Sulphur insecticides. *See* 881.21.

572. MAGNESIA

U. S. Gov., Federal Specifications Board. HH–M–51; 1931. Magnesia Asbestos Plaster. For 85 per cent magnesia material, requirements on composition, molding and heating test, weight, and methods of analysis. Used for insulating pipes and other surfaces against heat.

U. S. Gov., Federal Specifications Board. HH–M–71; 1931. Magnesia Molded Pipe Covering and Blocks. For 85 per cent magnesia material for pipe covering and lagging, requirements on composition, weight, standard thicknesses of pipe covering, weight of canvas cover, size and material of attachment bands, sizes of rectangular blocks, methods of analysis.

U. S. Gov., Federal Specifications Board. 445; 1927. Plastic Magnesia Cement Used as Flooring, Bases, Wainscots, Etc. For calcined caustic magnesia, fibrous materials, fillers, and colors when gaged with a solution of magnesium chloride to form a resilient product, requirements on tensile and transverse strength, expansion, time of set, fineness, soundness, chemical composition of magnesium chloride, methods of test.

References.—Magnesia pipe covering. *See also* 707.43. Boiler lagging sizes. *See also* 707.40.

573. SALT

References.—Salt as a condiment. *See also* 154.6. Salt, sodium chloride as a chemical reagent, medicinal, or agricultural supply. *See also* 834.9.

574. GRAPHITE AND MANUFACTURES THEREOF

Plumbago Crucible Assn. American Foundrymens Assn. Sponsors. Approved by American Standards Assn. as H 13–1925. Outside Dimensions of Plumbago Crucibles for Non-Tilting Furnaces in Nonferrous Foundry Practice. Standard size numbers, corresponding outside dimensions, and approximate capacities.

References.—Carbon brushes for electric motors. *See* 711.42.

575. CARBONS AND ELECTRODES

575.1 CARBON POWDERED

U. S. Gov., Federal Specifications Board. SS–F–111; 1930. Foundry Facings, Carbon-base. For coating face of sand molds in dry or wet form in iron and brass foundry work, for 5 grades, requirements on sieve analysis, percentages of volatile matter, fixed carbon, ash, and graphitic carbon, covering Ceylon graphite facings, foundry blacking, silver lead, charcoal, and sea coal foundry facings, methods of testing.

References.—Charcoal. *See* 501.6. Lampblack and bone black. *See* 842.4.

575.2 CARBON ELECTRODES

U. S. Gov., Federal Specifications Board. W–E–441; 1930. Amorphous Carbon Electrodes. Requirements on physical features affecting operating properties, for 7 sizes from 8 to 24 inches in diameter, requirements on length, tolerances on diameter and eccentricity, resistance, density, ash content, and crook, methods of sampling and testing.

References.—Carbon brushes for electric motors. *See* 711.42.

590–599 MISCELLANEOUS NONMETALLIC MINERALS

591. FLUORSPAR AND CRYOLITE

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Fluorspar. Sample No. 79 prepared and sold by the bureau with a certificate of its complete analysis, for use by industrial organizations and others as a comparison standard in checking the accuracy of analysis of fluorspar, etc.

592. FELDSPAR

U. S. Govt., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Feldspar. Sample No. 70 prepared and sold by the bureau with a certificate of its complete analysis, for use by industrial organizations and others as a comparison standard in checking the accuracy of analysis of similar material, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS23–30; 1930. Feldspar. Commercial standard classification accepted by industry, including a fineness classification with sieve grading requirements, a chemical composition classification with requirements on silica content and ratio of potash and soda for the ceramic or body grades, on soda content for the glazing grades, and on silica, alumina, and iron content for the glass making grades, methods of sieve testing and chemical analysis.

593. SILICA, DIATOMACEOUS EARTH, INFUSORIAL EARTH

American Marine Standards Committee. E No. 32–1930. Calcined Granular Diatomaceous Earth. For heat insulation purposes, requirements on freedom from clay and sand, temperature of calcination, fineness, percentage of silica, weight, and temperature of softening, methods of test.

U. S. Gov., Federal Specifications Board. SS–M–501; 1930. Silica Mold Wash. For 2 grades for use in steel foundry work for washing surfaces of sand molds, requirements on sieve analysis, silicon dioxide content, and percentage sediment in wash, methods of testing.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Purified Siliceous Earth. A fine odorless powder, a form of silica purified by boiling with acid, washing and calcining, physical properties, test requirements for purity. Used for medicinal purposes. Recognized as standard in enforcement of Federal food and drugs act.

References.—Silica brick. *See* 534.12.

594. SOILS

American Ceramic Society. Journal of A. C. S. for June, 1928. Tentative Method. Sampling Clay Deposits. Method for preliminary and for extended sampling.

American Electric Railway Engineering Assn. W201–15; 1915. Classification and Bearing Power of Soils. Mechanical analysis of soils into fine gravel, sands, silts, and clay, with sizes of screens used in making analysis. Same as given in U. S. Dept. of Agriculture Bull. No. 82.

American Society for Testing Materials. D 220–29; 1929. Method of Test for the Determination of Moisture Equivalent of Sub-Grade Soils in the Field. Treatment of sample, test procedure for determining water absorption qualities of subgrade soil for road work.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Soils, Tentative. Sampling, preparation of sample and reagents, apparatus and test procedure for determination of moisture, loss on ignition, carbonate carbon, organic carbon, nitrogen, silica, metal oxides, calcium, magnesium, manganese, iodine, sulphur, phosphorus, potassium and sodium, nitrate nitrogen, alkali salts.

U. S. Gov., Dept. of Agriculture. Bureau of Chemistry and Soils. Dept. Circ. 419; 1927. Grouping of Soils on Basis of Mechanical Analysis. Classification of soils based on percentages of clay, sand, loam, and silt, 20 classes classified under 3 classes dependent on percentage of clay, 5 special classes comprising peat, muck, gravelly, and stony soils.

U. S. Gov., Dept. of Agriculture. Bureau of Chemistry and Soils. Tech. Bulletin 170; 1930. A Pipette Method of Mechanical Analysis of Soils Based on Improved Dispersion Procedure. Standard method used by bureau for preparation and dispersion of soil samples and for separation into 8 particle sizes from fine gravel to colloid.

References.—Soil pavements. *See also* 518.38.

599. NONMETALLIC MINERALS NOT ELSEWHERE CLASSIFIED

American Institute of Mining and Metallurgical Engineers. Adopted by American Standards Assn. as M 13–1925. Recommended Practice for Rock Dusting Coal Mines to Prevent Coal Dust Explosions. Kind, size, and amounts of dust to be used, parts of mine to be dusted, sampling of dust after mine has been dusted.

600-699 ORES, METALS, AND MANUFACTURES

(Except machinery, vehicles, and electrical supplies)

600-609 IRON AND STEEL

600. GENERAL ITEMS RELATING TO BOTH FERROUS AND NONFERROUS MATERIAL

600.1 TESTING OF METALS

American Assn. of State Highway Officials. Tentative Method. T-68. Undated. Methods of Tension Testing of Metallic Materials. Same as E 8-27T of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T-69. Undated. Methods of Compression Testing of Metallic Materials. Same as E 9-27T of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T-70. Undated. Methods of Brinell Hardness Testing of Metallic Materials. Same as E 10-27 of Am. Soc. for Testing Materials.

American Electric Railway Engr. Assn. Recommended Practice. E 108-25, 1925. Proof Testing of Forgings to Determine Their Soundness After Quenching and Tempering. Drawing showing method of supporting axles and table of heights for dropping a tup of 1,640 or 2,000 lbs. onto axle, drawing of gauge for determining if permanent set is taken.

American Society for Testing Materials. A 33-24; 1924. Standard Methods of Chemical Analysis of Plain Carbon Steel. Methods of analysis, reagents required and description of test apparatus for determination of carbon, manganese, phosphorus, sulphur, silicon, copper, nickel, and chromium, methods of sampling rolled and forged steel products for check analysis.

American Society for Testing Materials. A 34-28; 1928. Methods of Test for Magnetic Properties of Iron and Steel. For induction and hysteresis measurement, definitions, requirements for test specimens, data required, four standard methods of test listed but not described, with limitations of each; for core loss measurement, definitions, procedure, requirements of testing apparatus, and sampling; for measurement of properties at low inductions and audio frequencies, requirements for test specimens, apparatus, and procedure, calculation of induction and permeability.

American Society for Testing Materials. A 55-24; 1924. Standard Methods of Chemical Analysis of Alloy Steels. Methods of analysis, reagents required for determination of nickel, manganese, silicon, chromium, phosphorus, vanadium, sulphur, tungsten, cobalt, molybdenum, with reference to A 33-24, Analysis of plain carbon steel for determination of carbon, manganese, etc.

American Society for Testing Materials. A 124-29; 1929. The Arbitration Test Bar and Tension Test Specimen for Cast Iron. Form and dimensions of pattern and mold for casting test bar intended for transverse testing and dimensions of tension test bar machined from a portion of arbitration test bar.

American Society for Testing Materials. Tentative Definitions. A 127-31T; 1931. Definitions of Terms, With Units and Symbols, Relating to Magnetic Testing.

American Society for Testing Materials. A 130-30; 1930. Methods of Sampling Rolled and Forged Steel Products for Check Analysis. Requirements on method of taking and preparation of sample, location of sample in large sections, blooms, billets, rounds, shapes, bored forgings, thin material, and rolled sheets.

American Society for Testing Materials. E 2-30; 1930. Rules Governing the Preparation of Micrographs of Metals and Alloys. Standard magnifications, rules for reproductions, recommended lenses, definition of grain and methods of measurement of grain size. Recommended practice for photography as applied to metallography, illumination of specimens, recommended photographic materials.

American Society for Testing Materials. E 3-24; 1924. Methods of Metallographic Testing of Iron and Steel. Macroscopic and microscopic examination, etching solutions and reagents for different grades of steel and alloy steels, methods for indicating distribution of sulphur and for indicating small cracks, location of test pieces, methods of polishing and etching.

American Society for Testing Materials. E 4-27; 1927. Methods of Verification of Testing Machines. For testing machines that measure load, methods of verification by standard weights, by standardized proving levers, by means of elastic calibration device, and by comparison method, tolerances for new and for used machines.

American Society for Testing Materials. E 5-27; 1927. Methods of Metallographic Testing of Nonferrous Metals and Alloys. Macroscopic and microscopic examination, etching solutions and reagents for the different alloys, location of test pieces, methods of polishing and etching including electrolytic etching.

American Society for Testing Materials. E 6-30 and E 6-30T; 1930. Definitions of Terms Relating to Methods of Testing. Definitions of stress, strain, stress-strain diagram, elastic limit, yield point, tensile strength, compressive strength, modulus of elasticity.

American Society for Testing Materials. E 7-27; 1927. Definitions of Terms Relating to Metallography. Includes definitions of grain, grain size, micrograph, metallography, etc.

American Society for Testing Materials. Tentative Test Methods. E 8-27T; 1927. Methods of Tension Testing of Metallic Materials. Recommended dimensions, design, and gage marking for test specimens from various shapes of material, shaping of ends of specimen and design of gripping devices, speed of operation of testing machine, determination of elastic limit, yield point, tensile strength.

American Society for Testing Materials. Tentative Test Methods. E 9-27T; 1927. Methods of Compression Testing of Metallic Materials. Dimensions and design of 3 recommended sizes of compression test specimens, design of bearing blocks, speed of operation of testing machine, determination of elastic limit, yield point, and compressive strength.

American Society for Testing Materials. E 10–27; 1927. Methods of Brinell Hardness Testing of Metallic Materials. Tables of Brinell hardness numbers for various diameters of indentation for a 10 mm. ball and 500 and 3,000 kilogram loads, requirements of microscope, ball and test specimen, rules for application of load and for measurement of impression, calibration of hardness testing apparatus.

American Society for Testing Materials. E 12–27; 1927. Definitions of Terms Relating to Specific Gravity. Covers specific gravity and absolute specific gravity of solids and liquids, apparent specific gravity of solids, and bulk specific gravity of solids.

American Society for Testing Materials. Tentative Recommended Practice. E 14–30T; 1930. Thermal Analysis of Steel. Requirements for apparatus, furnace, and thermocouple, size of test specimen, test procedure for both inverse rate method and differential method.

American Society for Testing Materials. E 15–29; 1929. Recommended Practice for Radiographic Testing of Metal Castings. Defects that may be revealed by X rays, equipment and size of X-ray tube for certain size castings, radiographic technique.

Association of American Steel Manufacturers. Standard Methods of Sampling and Permissible Variations for Check Analysis of Rolled and Forged Steel Products; 1928. Location of samples, number of check analyses, premissible variation in composition from the ordered limits.

National Engineering Inspection Assn. Tentative Methods of Procedure for Inspection of Materials; 1930. Covers general procedure such as checking of order, witnessing of tests, surface inspection, marking, and reports; for mill, shop, and field inspection of structural steel for buildings and bridges; for inspection of tee and girder rails, steel plate pipe, rolled or drawn steel and iron pipe, boiler and firebox steel, and cast iron pipe.

Society of Automotive Engineers. 1931 Handbook. Recommended Practice. Brinell Hardness Test; 1924. Requirements on size of ball and applied weight, table of Brinell hardness numbers.

Society of Automotive Engineers. 1931 Handbook. Recommended Practice. Rockwell Hardness Tests; 1927. Explanation of method of test and of readings obtained, application to different types of specimens.

Society of Automotive Engineers. 1931 Handbook. Test Specimens, Iron and Steel; 1922. Location of test specimens for various materials, dimensions of tension and bend test specimens.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Acid open-hearth steel. Sample No. 19c of 0.2 C, No. 20c of 0.4 C, No. 21c of 0.6 C, No. 34a of 0.8 C, and No. 35a of 1.0 C, prepared and sold by the bureau with a certificate of analysis in each case, for use by industrial organizations and others as comparison standards in checking the accuracy of analyses of similar steels, etc., average analyses shown in supplement to C25.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Basic open-hearth steel. Sample No. 15b of 0.1 C, No. 11d of 0.2 C, No. 12c of 0.4 C, No. 13c of 0.6 C, No. 14b of 0.8 C, and No. 16b of 1.0 C, prepared and sold by the Bureau with a certificate of analysis, for use by industrial organizations and others as a comparison standard for checking the accuracy of analyses of similar steels, etc., average analyses shown in supplement to C25.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Bessemer steel. Sample No. 8d of 0.1 C, No. 9c of 0.2 C, No. 10d of 0.4 C, No. 22b of 0.6 C, and No. 23a of 0.8 C, prepared and sold by the bureau with a certificate of analysis, for use by industrial organizations and others as a comparison standard for checking the accuracy of analyses of similar steels, etc., average analyses shown in supplement to C25.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Electric steels. Sample No. 51 for electric furnace steel of 1.2 C, and sample No. 65a for acid electric steel, prepared and sold by the bureau with a certificate of analysis in each case, for use by industrial organizations and others as comparison standards for checking the accuracy of analyses of similar steels, etc., average analyses shown in supplement to C25.

U. S. Gov., Federal Specifications Board. 339a; 1929. Metals. General requirements applicable to all metal specifications and intended to form a part of all detail specifications for metals. Covers responsibility for manufacturing methods, information and facilities to be furnished by contractor, procurement of samples and identification, selection and type of physical test specimen and methods of test, reports, packing and shipping requirements, information on inspection and tests and definitions of terms.

References.—Other test methods. *See* specifications under individual commodities. Proving rings for calibrating testing machines. *See* 919.9.

600.2 CLASSIFICATION OF METALS

American Electric Railway Engr. Assn. Recommended Classification. PS100–29; 1929. Classification of Scrap Materials. Ferrous scrap classified under 21 numbered classes, each class defined as to kind and size of railroad material included, nonferrous scrap classified into 22 numbered classes.

American Electric Railway Engr. Assn. Misc. Methods and Practices. PS200–26; 1926. Classification of Materials and Supplies for Electric Railways. Assignment of numbers to 74 defined classes of materials and supplies, storeroom form showing operation in these materials.

American Railway Assn. Purchases and Stores Div. Classification of Scrap Iron and Steel; 1927. Classification of locomotive, car, track, and building parts under numbered headings of scrap material, classed according to the material in the part, its condition, size, etc., including iron, steel, copper, brass, lead, aluminum, white metal, zinc, burlap, barrels, belting, canvas, linoleum, rope, and rubber.

American Railway Assn. Purchases and Stores Div. Standard Material Classification; 1922. Classification of the materials used by railroad under main numbered headings with detail lists of materials under each heading and the unit in which purchased.

National Assn. of Waste Material Dealers (Inc.). Circular L; 1930. Standard Classification for Old Metals. Number and code word for each class with definition of class, types of material, limitations on maximum dimensions, percentages of certain kinds, etc., covers brass, copper, pewter, zinc, lead, aluminum, babbitt.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R58; 1928. Classification of Iron and Steel Scrap. Simplified practice recommended and accepted by industry establishing and defining various standard classes and grades of scrap under the general classes of scrap for blast furnaces, for basic open-hearth furnaces, low phosphorus and low sulphur scrap for acid open hearth furnaces, scrap for electric furnaces, for gray iron foundry practice, for bessemer converters, and for miscellaneous purposes.

600.3 COATING OF METALS

American Assn. of State Highway Officials. Tentative Method. T–65. Undated. Methods for Determining Weight of Coating on Zinc Coated Articles. Same as A 90–30 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method. T–66. Undated. Methods of Test for Uniformity of Galvanizing or Spelter Coating on Wire. Requirements on preparation of standard copper sulphate solution, quantity of solution, number of samples, cleaning of samples, test procedure.

American Electric Railway Engr. Assn. D6–14; 1914. Specification for Galvanizing or Sherardizing on Iron and Steel. Test requirements for immersion test of samples in standard copper sulphate solution.

American Institute of Electrical Engineers. Standard No. 60; 1928. Joint sponsors with American Electric Railway Assn., American Railway Engineering Assn., American Society for Testing Materials, Assn. of Edison Illuminating Companies, Assn. of Railway Electrical Engineers, National Board of Fire Underwriters, National Electric Light Assn., National Electrical Manufacturers Assn., National Fire Protection Assn. under auspices of American Standards Assn., C 8 b1–1928. Specifications for Tinned Soft or Annealed Copper Wire. Includes requirements on tinning and tests for tinning.

American Railway Assn. Electrical Section VI–a–23; 1923. Electric Light, Power Supply and Trolley Lines Crossing Railways. Appendix C. Galvanizing or Sherardizing on Iron and Steel. Requirements on preparation of copper sulphate test solution, test procedure and test requirements for galvanized wire and other galvanized or sherardized material.

American Railway Assn. Signal Section. 2211; 1911. Galvanized E. B. B. Bonding Wires. Includes tests for galvanizing, cleaning of samples, preparation and neutralization of copper sulphate solution, immersion procedure and effects necessitating rejection.

American Railway Assn. Signal Section. 2330; 1930. Channel Pin. For fastening bond wires into railroad rails, includes requirements on quality of tin in plating and tin plating test requirements.

American Railway Assn. Signal Section. 2912; 1912. Galvanizing for Iron or Steel. Test for galvanizing, cleaning of sample, preparation of neutralized copper sulphate solution, size of jars and amount of testing solution for various type samples, routine and length of immersions for testing quality of zinc coating.

American Railway Assn. Telegraph and Telephone Section. S–1; 1923. Electric Light, Power Supply, and Trolley Lines Crossing Railways. Includes test requirements for testing galvanized or sherardized material in standard copper sulphate solution.

American Society for Testing Materials. A 90–30; 1930. Standard Methods for Determining Weight of Coating on Zinc Coated Articles. Shop weighing test method, sampling, standard hydrochloric acid-antimony chloride method, alternate basic lead acetate and sulphuric acid permanganate methods, field test methods including Preece or copper sulphate dip, thermal, and evolution of hydrogen methods.

American Society for Testing Materials. A 91–24; 1924. Standard Methods of Determining Weight of Coating on Tin, Terne, and Lead-Coated Sheets. Sampling, for terneplate the method of dissolving the coating and part of iron in acid and making separate determinations of iron, tin, and lead, for tin coated sheets the method of determining tin directly.

American Society for Testing Materials. A 110–30; 1930. Methods of Testing Zinc Coated (Galvanized) Iron and Steel Wire and Wire Products. Covers testing of coatings applied by hot dip or electro-deposition. Weight of coating and uniformity determined by A. S. T. M. method A 90, dip designation meaning, wrap test requirements for coated wire.

American Society for Testing Materials. A 123–30; 1930. Approved by American Standards Assn. as G8c–1930. Zinc (Hot Galvanized) Coatings on Structural Steel Shapes, Plates and Bars and Their Products. Zinc according to A. S. T. M. Spec. B 6, permissible impurities in zinc bath, minimum allowed weight of zinc coating and method of test, visual inspection requirements.

Ashphalt Shingle and Roofing Institute. Nails. Zinc in Protective Coating; 1921. Recommends hydrochloric acid-antimony chloride method for determining amount of zinc in protective coating, apparatus requirements, test procedure.

National Electric Light Assn. Suggested Specification. D210–22; 1922. Hot Galvanizing. Requirements on composition of standard test solution of copper sulphate, test procedure for detecting copper deposit after specified number of immersions. Published in 1924 N. E. L. A. proceedings.

Society of Automotive Engineers. 1931. Handbook. Flexible Conduit Ferrules; 1928. Includes salt spray test requirements for zinc or cadmium plated steel ferrules.

American Railway Assn. Telegraph and Telephone Section. 1–D–5. Undated. Galvanizing for Iron and Steel. Requirements on preparation of copper sulphate solution, number of samples of wire or hardware immersed simultaneously, time of immersion and temperature of solution, test procedure.

Underwriters' Laboratories. Rigid Steel Conduit; 1931. Zinc coating on conduit. Requirements on elasticity test of coating by bend test of coated conduit, test for amount of coating by dipping in copper sulphate solution, number of dips for electroplated, shearidized, and hot dipped types of coating, preparation of standard copper sulphate solution, test procedure.

Underwriters' Laboratories. Tin Clad Fire Doors and Shutters; 1930. Includes standard method for the determination of weight and composition of coating on terne plate for tin clad fire doors and shutters.

U. S. Gov., Federal Specifications Board. 297; 1925. Wire Rope. Galvanizing. Minimum number of immersions for testing thickness of zinc coating by Preece method.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Nickel Plating. Test of Nickel Plating on Brass. Requirements for thickness of nickel plating on articles according to amount of abrasion received in use. Electrolytic solution of nickel plating and determination of amount by dimethylglyoxime method.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Chromium Plating. For chromium plating on hardware, requirements on sequence of plating operations and thicknesses of coatings for chromium on nickel on nonferrous metals and for chromium on nickel on cadmium on polished steel, tolerance on individual pieces, methods of test.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Nickel Plating. For nickel plating on hardware, requirements on thickness of coating for plating on nonferrous metals and of combined coating of nickel on cadmium or copper base for nickel plating on polished steel, methods of test.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Zinc Coatings. Requirements on thickness of coating on hardware and also on accurately machined parts such as screw threads, methods of testing.

References.—Nickel salts for nickel plating. *See* 839.39. Ammonium chloride (sal ammoniac) for galvanizing purposes. *See* 831.4. Other metallic coating requirements and methods of test. *See* specifications under individual commodities.

600.4 DEFINITIONS OF METALS

American Society for Testing Materials. A 81–30; 1930. Definitions of Terms Relating to Wrought-Iron Specifications. Definitions of wrought iron, bushelling, muck bar or puddled bar, slab pile, box pile, etc.

American Society for Testing Materials. E 7–27; 1927. Definitions of Terms Relating to Metallography. Definitions of alloy, alpha and beta brass, grain, micrograph, macrograph, etc.

600.5 HEAT TREATMENT OF METALS

American Society for Steel Treating. Handbook p. 91; 1929. Tentative General Recommendations for Heat Treatment of Tool Steels. General principles and precautions, types of cooling mediums and quenching mediums, explanatory items with reference to cooling, tempering, normalizing and annealing, recommendations.

American Society for Steel Treating. Handbook p. 96; 1925. Recommended Practice for the Heat Treatment of Plain Carbon Tool Steel. Normalizing of steel before hardening, heating, quenching and tempering, tables of temperatures for the above steps for steels of various carbon content.

American Society for Steel Treating. Handbook p. 100; 1925. Recommended Practice for the Heat Treatment of 18 per cent Tungsten High-Speed Steel. Instructions for annealing, quenching, preheating, tempering, with temperatures specified and recommended baths.

American Society for Steel Treating. Handbook p. 102; 1928. Recommended Practice for the Heat Treatment of Nonshrinking, Nondeforming, Oil-Hardening Tool Steels. Applies only to steels of the chemical composition given. Instructions for heating for annealing, cooling, heating for quenching, quenching and tempering in oil, temperatures specified.

American Society for Steel Treating. Handbook p. 104. Recommended Practice for the Heat Treatment of Finishing Steel; 1927. Applies to fast finishing tool steel but not to high speed steel. Percentages of carbon, tungsten, chromium, and vanadium in steels considered, temperatures and procedure for annealing, quenching, and tempering.

American Society for Steel Treating. Handbook p. 105; 1927. Recommended Practice for the Heat Treatment of Taps and Milling Cutters. Applies to tools of plain carbon tool steel, 18 per cent tungsten high-speed steel, and 1.50 to 2 per cent tool steel of chemical compositions specified. Instructions for annealing of steel after forging and before machining, and for annealing for removing machining strains, annealing temperatures and times.

American Society for Steel Treating. Handbook p. 108. Recommended Practice for the Heat Treatment of Dies for Die Casting; 1930. Chemical composition of 6 steels suitable for dies, instructions for normalizing after forging, annealing, hardening and tempering of chromium-vanadium and of tungsten die casting steels.

American Society for Steel Treating. Handbook p. 113. Tentative Recommended Practices for the Heat Treatment of Plain and Alloy Steel Die Blocks; 1931. Includes cold and hot forming plain carbon die blocks, alloy steel die blocks, cold heading die-blocks XIII, and die blocks for silverware. Chemical composition of steels considered, temperatures and time for normalizing, annealing, hardening, and tempering.

American Society for Steel Treating. Handbook p. 125. Tentative Recommended Practice for the Heat Treatment of Blanking Dies and Punches; 1928. Chemical composition, temperatures for normalizing, annealing, hardening, and tempering, and quenching medium for eleven steels including plain carbon, chrome vanadium, tungsten, and high-speed steel.

American Society for Steel Treating. Handbook p. 128; 1928. Tentative Recommended Practice for the Heat Treatment of Shear Blades. Chemical composition of steels for shears for hot and cold work on heavy and light material, heat treatment specification for each of the 10 listed steels.

American Society for Steel Treating. National Metals Handbook p. 131. Tentative Recommended Practice for Heat Treatment of Chisels; 1929. Approximate chemical composition of 5 suitable steels with recommended heat treatment for each grade.

American Society for Steel Treating. Handbook, p. 132; 1929. Recommended Practice for the Heat Treating of Carbon Steels. S. A. E. Series. Chemical compositions, normalizing, annealing, quenching, and tempering temperatures, quenching medium and temperatures specified for S. A. E. steel Nos. 1010, 1020, 1025. 1030, 1035, 1040, 1045, automobile parts to which each steel is applicable, including the use of Nos. 1010 and 1020 for bolts, pins, cap screws, Nos. 1025 and 1030 for forgings, pressed and stamped parts, frames and washing machine parts.

American Society for Steel Treating. National Metals Handbook, p. 137. Recommended Practice for the Heat Treatment of Carbon Steel Castings; 1929. Covers commercial castings for ordinary construction purposes, chemical compositions, recommended temperatures for single normalizing and annealing, for double normalizing and annealing, and for oil and water quenching with temperatures and times specified.

American Society for Steel Treating. National Metals Handbook, p. 142. Recommended Practice for the Heat Treatment of Alloy Steel Castings; 1929. For commercial alloy castings for ordinary construction purposes, approximate chemical compositions for 25 alloy steels, recommendations on normalizing treatments, annealing temperatures, quenching and tempering times and temperatures for each steel.

American Society for Steel Treating. Handbook, p. 148; 1929. Recommended Practice for the Heat Treatment and Care of Sling and Crane Chain. Recommendations for normalizing, testing, and inspecting chain after welding, precautions in use, safe load for different loadings, reduced factor of safety of worn chain, annealing treatment for iron chain.

American Society for Steel Treating. Handbook, p. 155; 1929. Recommended Practice for the Heat Treatment of Oil Hardening Alloy Gears.

Pertains only to gears of about the size of passenger car sliding gear. Chemical composition, normalizing, preliminary quenching and annealing after forging, heating, quenching and tempering of the gears for S. A. E. Steels Nos. 2345, 3250, 5150, and 6150.

American Society for Steel Treating. National Metals Handbook, p. 158. Recommended Practice for the Heat Treatment of Plain Carbon and Alloy Spring Steel; 1929. Applies to medium and large coil springs and to flat springs. Chemical composition for 3 alloy and 2 carbon steels considered, recommendations on hardness limits of received steel, on normalizing, quenching and tempering temperatures and procedure, hardness limits of product.

American Society for Steel Treating. Tentative Recommended Practices; 1931. Heating, Forging, and Heat Treating of Locomotive Forgings. The Heat Treatment of Spline Shafts. The Heat Treatment of Rivet Sets for Hot Work.

American Society for Steel Treating. National Metals Handbook, p. 217. Recommended Practice for the Carburizing and Heat Treatment of Camshafts; 1929. For S. A. E. steels 1015, 1020, 2320, 2512, 3120, 6120, nickel-molybdenum, and chrome vanadium steels, chemical compositions, recommended annealing and heat treatment before machining, carburizing, temperatures for carburizing, quenching and tempering, heating and quenching mediums.

American Society for Steel Treating. National Metals Handbook. p. 220. Recommended Practice for the Carburizing and Heat Treating of Gears; 1929. Chemical composition of 8 steels considered, temperatures and method of cooling for annealing, temperatures for carburizing and quenching, quenching medium, for each steel, for each of 3 purposes for which heat treatment is undertaken.

American Society for Steel Treating. National Metals Handbook p. 224. Recommended Practice for the Carburizing and Heat Treating of Piston Pins; 1929. Chemical compositions, instructions for carburizing, carburizing, quenching, and tempering temperatures, and quenching medium recommended for S. A. E. steels 1015, 2315, 2512, 3115, 4615, and 6115.

American Society for Steel Treating. Handbook Sheet A1–5601. Data Sheets; 1927. Heat Treatment of Wrought Aluminum Alloys of High Strength. Chemical composition, properties, grades and tempers for duralumin, 17S, 25S, and 51S alloys, mechanical properties, discussion of practice and suitable temperatures for annealing, for solution heat treatment, for precipitation heat treatment, welding and forming properties of the alloys.

American Society for Testing Materials. Recommended Practice. A 35–24; 1924. Annealing of Miscellaneous Rolled and Forged Carbon Steel Objects. Rates of heating and cooling with temperatures specified for various steels, for removing coarse grain, for great softness and ductility, for high tensile strength and elastic limit, for removing effects of rolling and cold working, for combined high ductility and tensile strength, etc.

American Society for Testing Materials. Recommended Practice. A 36–24; 1924. Heat Treatment of Carbon Steel Castings. Procedure for annealing, normalizing, reheating, quenching, and recommended annealing temperatures for various carbon content steels.

American Society for Testing Materials. Recommended Practice. A 37–27; 1927. Carburizing and Heat Treatment of Carburized Objects. Procedure and precautions to be observed, table of temperatures and cooling mediums recommended for preliminary heat treatment, carburizing, refining and hardening for 13 S. A. E. steels, common defects in carburized objects.

American Society for Testing Materials. A 119–30; 1930. Definitions of Terms Relating to Heat Treatment Operations (Especially as Related to Ferrous Alloys).

Society of Automotive Engineers. 1931 Handbook. General Heat Treatments; 1930. General information on heat treatments applicable to the various steels specified in the Handbook. Not a part of the standard specifications but intended as a guide to heat treatment and the physical properties that may be expected after heat treatment.

References.—Other heat treatment requirements. *See* specifications under individual commodities.

600.6 PLUMBING

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Plumbing; 1926. Supporting, minimum fall, uses of bends, weights of cast-iron soil pipe, general quality requirements for wrought-iron pipe, lead pipe, brass pipe, connections, installation of pipe and fittings, minimum sizes for various applications, etc., typical plumbing fixtures with main dimensions.

National Assn. of Master Plumbers of the U. S. Plumbing Symbols; 1927. Standard symbols for plumbing fixtures, drains, and exposed piping for various purposes, symbols for piping include plan and line symbols, band initial and band color.

U. S. Gov., Dept. of Commerce. Bureau of Standards. BH13; 1928. Recommended Minimum Requirements for Plumbing. Recommended by Building Code Committee for incorporation in building codes of States and cities, includes definitions of terms, regulations on slope of horizontal piping, change in direction, prohibited fittings, quality of materials in general according to A. S. T. M. specifications, requirements on minimum thickness of sheet metals, construction of joints and connections, kinds, sizes, materials, and required installation of traps, pipe cleanouts, back water valves, water supply pipes, waste stacks, vent pipes, house drains and sewers, storm drains, etc., inspection and test requirements for completed installation, recommended construction details.

References.—Plumbing fixtures. *See* 617.7.

600.7 WEIGHTS AND TOLERANCES OF IRON AND STEEL

American Society for Testing Materials. E 12–27; 1927. Definitions of Terms Relating to Specific Gravity. Specific gravity, absolute, apparent and bulk.

Association of American Steel Manufacturers. Standard Practice Governing Allowable Variations in Size and Weight of Hot Rolled Bars; 1910. Standard allowable variations in weight of bar sizes of angles, tees, zees, and channels, and variations in size of rounds, squares, hexagons, and flats.

Assn. of American Steel Manufacturers. Standard Permissible Variations in Gage Weight, Gage Thickness, Size and Flatness of Sheets and Light Plates Blue Annealed; 1929.

601. ORES, PIG IRON, AND SCRAP

601.1 IRON ORE

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Crescent iron ore. Sample No. 26 prepared and sold by the bureau with a certificate giving percentages of Al_2O_3, CaO, and MgO, for use by industrial organizations and others as a comparison standard in checking the accuracy of analysis of iron ores, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Magnetite iron ore (titaniferous). Sample No. 29 prepared and sold by the bureau with a certificate giving complete analysis, for use by industrial organizations and others as a comparison standard in checking the accuracy of analysis of iron ores, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Norrie iron ore. Sample No. 28 prepared and sold by the bureau with a certificate giving percentage Mn (low), for use by industrial organizations and others as a comparison standard in checking the accuracy of analysis of iron ores, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Sibley iron ore. Sample No. 27a prepared and sold by the bureau with a certificate giving percentages of SiO_2, P, and Fe, for use by industrial organizations and others as a comparison standard in checking the accuracy of analysis of iron ores, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C26; 1921. Analyzed Iron and Manganese Ores, Methods of Analysis. With special reference to standard samples Nos. 25b, 26, 27a, 28, and 29 of iron ores, the methods used by the bureau are given for mixing and drying of material, for determination of silica, phosphorus, sulphur, aluminum, titanium, vanadium, iron, etc., standardization of permanganate solutions.

References.—Chrome, manganese, and silicon ores. *See* 621.1. Ferrochrome, ferromanganese, etc. *See* 621.2.

601.2 PIG IRON

601.20 General Items

American Society for Testing Materials. A 64–27; 1927. Standard Methods of Sampling and Chemical Analysis of Pig and Cast Iron. Sampling and treatment of samples from pig and casting, permissible variations in chemical analyses from different sources, determination of total carbon, of manganese, phosphorus, sulphur, silicon, small amounts of chromium, nickel, copper, titanium, arsenic.

601.21 Charcoal Pig Iron

601.22 Coke Pig Iron

601.23 Foundry Pig Iron

American Railway Assn. Mechanical Division. Recommended Practice; 1916. Iron, Foundry Pig. Chemical composition requirements for three grades, foundry coke, low silicon, and high manganese pig iron and also for foundry charcoal pig iron.

American Society for Testing Materials. A 43–24; 1924. Foundry Pig Iron. Permissible variations from purchasers chemical composition, specifications, sampling requirements, recommends standard methods of sampling and chemical analysis of A. S. T. M. No. A 64.

U. S. Gov., Federal Specifications Board. 126a; 1928. Foundry Pig Iron. For 4 regular grades, requirements on chemical composition, for special grades, permissible tolerances on specified compositions, to conform to F. S. B. Spec. 339 for metals.

References.—Methods of testing and general requirements for metals. *See also* 601.20, 600.1. Ferrochrome, ferromanganese, etc. *See* 621.2.

601.24 Malleable Pig Iron

601.3 IRON AND STEEL SCRAP

References.—Classification of scrap metals. *See* 600.2.

602. CRUDE AND SEMIFINISHED IRON AND STEEL

602.1 IRON BILLETS

American Society for Testing Materials. A 73–30; 1930. Wrought-Iron Rolled or Forged Blooms and Forgings for Locomotives and Cars. For 2 grades of material, requirements on chemical composition, tension and etch tests.

602.2 STEEL BARS AND BILLETS

American Railway Assn. Mechanical Division. Recommended Practice; 1925. Carbon Steel Blooms, Billets, and Slabs for Forgings. Five classes according to carbon content, class A for welding and casehardening, class B for casehardening when later heat treated, class C for special purposes, class D for axles, shafts, connecting rods, class E for class D that are to be heat treated. Chemical analysis of each class.

American Society for Testing Materials. A 17–29; 1929. Carbon Steel and Alloy Steel Blooms, Billets, and Slabs for Forgings. Includes one type of carbon steel, chemical composition test requirements, reduction from ingot requirements and permissible chipping.

U. S. Gov., Federal Specifications Board. 316; 1925. Steel Blooms, Billets, Slabs, and Bars for Reforging, Carbon and Alloy. General quality requirements, amount of ingot discard, minimum reduction in area in rolling from ingot to billet, sampling, chemical composition, tensile test, and cold bend test requirements for 4 grades of carbon steel and 6 grades of alloy steel.

References.—Methods of analysis, general requirements for metals. *See also* 600.1. Alloy steel billets. *See* 621.31.

603. IRON AND STEEL BARS, RODS, AND WIRE

603.0 GENERAL ITEMS

American Railway Assn. Purchases and Stores Div. Standard Method of Designating Class, Kind or Grade of Steel and Iron Bars by Painting the Ends; 1926. Recommended colors for engine bolt and staybolt iron, for mild steel, and for bar iron.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Common, Merchants, Mild Steel or Open-Hearth Bars. Dimensions of recommended standard sizes, 24 rounds, 11 squares, 4 half rounds, and 89 flat bars, bands, and plates.

603.1 WROUGHT IRON BARS AND RODS

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Iron stays and rivet bars. Requirements on tension test and bend test.

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Round and flat iron bars. For bars as rolled and for bars reduced by machining, requirements on tension test, cold bend and hot bend tests.

American Electric Railway Engr. Assn. E16–24; 1924. Standard Specification for Refined Wrought-Iron-Bars. (Identical with A. S. T. M. Specification A41–18.) Tension, bend and etch tests, and permissible variations in dimensions of round and flat bars.

American Electric Railway Engr. Assn. Recommended Specification W104–28; 1928. Approved by American Standards Assn. as tentative standard E10–1929. Specification for Materials for Use in the Manufacture of Special Trackwork. Includes wrought iron common or refined for rods, reinforcing, bars, fillers and small forgings. Manufacture according to A. S. T. M. or A. R. A. specifications, tensile strength requirements.

American Railway Assn. Mechanical Division. Recommended Practice; 1926. Engine Bolt Iron, Puddled iron, tensile, bend, step, and etch test requirements, permissible variations in gage of round, square and hexagonal bars.

American Railway Assn. Mechanical Division. Recommended Practice; 1926. Staybolt Iron Hollow, Locomotive. From puddled or charcoal iron, chemical analysis, tension, bend, splitting and etch test requirements, variation in gage.

American Railway Assn. Mechanical Division. Recommended Practice; 1926. Staybolt Iron, Solid, Locomotive. From puddled or charcoal iron, chemical analysis, tension, bend and etch test requirements, variation in gage.

American Railway Assn. Mechanical Div. Recommended Practice. Wrought Iron Bars, Refined; 1930. Requirements on chemical composition, tension tests, bend tests, hot bend tests, nick bend tests, and etch tests.

American Railway Assn. Signal Section. 1830; 1930. Wrought Iron Bars. General quality requirements, tensile, fracture, bend, and etch test requirements, permissible variations in dimensions.

American Society of Mechanical Engineers. Boiler Construction Code. Section II; 1930. Specifications for Boiler Rivet, Staybolt, and Extra-Refined Bar Iron. For reworked, puddled or charcoal iron, tension, bend and etch test requirements, permissible variation in gage. Based substantially on A. S. T. M. standard specifications for staybolt, engine bolt and extra-refined wrought iron bars (A84–27.)

American Society of Municipal Engineers. Sewers; 1927. Includes wrought iron used in sewer construction, general quality of merchant iron, tensile strength and elastic limit requirements, fracture test requirements.

American Society for Testing Materials. A 41–30; 1930. Approved by American Standards Assn. as G12–1931. Refined Wrought-Iron Bars. Tension, bend, and etch test requirements, standard gages and permissible variations in gage. 1918 edition available in Spanish and in French from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 84–30; 1930. Staybolt, Engine-Bolt and Extra-Refined Wrought-Iron Bars. For three grades of iron, chemical composition and tests, tension, bend and etch test requirements, permissible variations in gage. 1924 edition available in Spanish and Portuguese from Bureau of Foreign and Domestic Commerce, U. S. Dept. of Commerce.

American Society for Testing Materials. A 85–27; 1927. Common Iron Bars. May be of reworked iron scrap with some steel scrap. Chemical composition and tests, tension, bend and etch test requirements, permissible variations in gage.

American Society for Testing Materials. A 86–30; 1930. Hollow Rolled Staybolt Iron. Chemical composition and tests, tension, bend, splitting, and etch test requirements, permissible variation in gage.

U. S. Gov., Federal Specifications Board. 391; 1926. Iron, Bar, Wrought, Refined. For one grade, tension test, cold bend test, hot bend test, fracture test, and metallographic examination requirements, permissible variations in dimensions specified.

References.—Standard sizes, marking of type. *See* 603.0. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals. *See* 600.2. Zinc coatings. *See* 600.3. Size and weight tolerances. *See also* 600.7.

603.2 CARBON STEEL BARS AND RODS

603.21 Steel Stock for Bolts, Nuts, Rivets, and Screws

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steel Rivets. Includes rivet bars for boiler rivets and for hull rivets, tension test requirements of bar stock.

American Railway Assn. Mechanical Div.; 1925. Rivet Steel and Rivets for Locomotive Tenders. Passenger and Freight Equipment Cars. Chemical composition, tension, bend, and flattening test requirements, dimensions and permissible variations.

American Railway Assn. Mechanical Division. Recommended Practice; 1923. Rivet Steel and Rivets for Steam Boilers and Other Pressure Vessels. Chemical composition, tension, bend and flattening test requirements, permissible variation in dimensions.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Steel Railway Bridges; 1924. Includes rivet steel specifications. Agree with A7–24 of American Society for Testing Materials except for permissible variation in weight of plates.

American Society of Mechanical Engineers. Boiler Construction Code. Section II; 1930. Specifications for Boiler Rivet Steel. Chemical analysis, tension and bend test requirements for rolled bars and bend and flattening test requirements for rivets, permissible dimension tolerances. Identical with A. S. T. M. Specifications for boiler rivet steel, A 31–24.

American Society of Mechanical Engineers. Boiler Construction Code. Section II. Specifications for Staybolt Steel; 1930. Chemical composition, tension and fracture test requirements, permissible variation in gage, for solid or hollow bars and for seamless steel tubing for staybolts.

American Society of Mechanical Engineers. Joint sponsor with Society of Automotive Engineers under procedure of American Standards Assn. B 18a–1927. Small Rivets, under $\frac{7}{16}$-inch diameter. Chemical composition, strength, ductility, and hardness tests for the rivet material, tables of standard dimensions and tolerances for the standard types, flat head, countersunk head, button head, pan head, and truss or wagon-box head rivets.

American Society of Mechanical Engineers. Joint sponsor with Society of Automotive Engineers under procedure of American Standards Assn. A. S. A. serial B 18g–1928. Tinners, Coopers' and Belt Rivets. Chemical composition, strength, ductility, and hardness requirements for the steel stock, tables of dimensions for the rivets.

American Society for Testing Materials. A 7–29; 1929. Structural Steel for Bridges. Includes rivet steel, chemical composition, tension, and bend test requirements.

American Society for Testing Materials. A 9–29; 1929. Structural Steel for Buildings. Includes rivet steel, chemical composition, tension and bend test requirements, permissible variations in cross section and weight from quantities specified.

American Society for Testing Materials. A 13–24; 1924. Rivet Steel for Ships. For rolled bars, required chemical composition and tests, tension and bend test requirements, permissible variation in diameter, for the rivets, bend and flattening test requirements.

American Society for Testing Materials. A 31–24; 1924. Boiler Rivet Steel. Chemical composition and tests, tension and bend test requirements, and permissible variation in diameter for the rolled bar, bending and flattening test requirements, and variations in diameter for the rivets. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 107–30; 1930. Commercial Quality Hot Rolled Bar Steels. Covers carbon steel rounds, squares and hexagons. Chemical composition and tests for two grades of screw steel, permissible variations in dimensions.

American Society for Testing Materials. A 108–30; 1930. Commercial Cold-Finished Bar Steels and Cold-Finished Shafting. Covers carbon steel rounds, squares, hexagons, flats, and shafts. Chemical composition and test requirements for 11 grades, including 2 grades of screw steel.

American Society for Testing Materials. A 113–29; 1929. Structural Steel for Locomotives and Cars. Includes rivet steel, chemical composition, tension and bend test requirements, permissible variations in weight and dimensions from quantities specified.

Assn. of American Steel Manufacturers. Structural and Boiler Steel; 1922. Includes structural rivet steel and boiler rivet steel, chemical composition, tension, and bend test requirements, permissible variations in size and weight of bars.

Society of Automotive Engineers. 1931 Handbook. Castle Hexagon Nuts, Aeronautic. Dimensions of nuts, tension test requirements of bar steel stock.

Society of Automotive Engineers. 1931 Handbook. Plain Hexagonal Nuts, Aeronautic; 1928. Dimensions of nuts and tensile test requirements of bar steel stock.

Society of Automotive Engineers. 1931 Handbook. Screw Stock Steel; 1931. Chemical composition requirements for 2 grades.

U. S. Gov., Federal Specifications Board. 351a; 1929. Steel, Structural, for Bridges. Includes 2 classes of rivet steel, noncopper and copper. Chemical composition, tensile test, and bend test requirements, permissible variations in dimensions from ordered quantities.

U. S. Gov., Federal Specifications Board. 352a; 1929. Steel, Structural, for Buildings. Includes class C, rivet steel, noncopper; class D, rivet steel, copper. Chemical composition, tensile test, and bend test requirements, permissible variations in size from sizes ordered.

U. S. Gov., Federal Specifications Board. 373a; 1929. Steel, Structural, for Cars. Includes grade E, rivet steel, noncopper, and grade F, rivet steel, copper. Chemical composition, tension test, and bend test requirements, permissible variations in dimensions of rounds and flats from ordered quantities.

U. S. Gov., Federal Specifications Board. QQ–S–751; 1931. Steel, Structural, for Ships Other Than Naval Vessels. Includes rivet steel. Chemical composition, tension test, and bend test requirements, permissible variations in dimensions.

U. S. Gov., Federal Specifications Board. 550; 1928. Steel, Staybolt, Boiler. One grade for either solid or hollow staybolts, physical appearance, chemical composition, tension test, bend test, and fracture test requirements, permissible variations in dimensions of round bars.

References.—Alloy steel stock for bolts, rivets, screws. *See* 621.31. Standard sizes, marking of type, of bars. *See* 603.0. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals, size and weight tolerances. *See also* 600.2, 600.7. Screws, bolts, rivets. *See* 608.2, 608.3, 608.4.

603.22 Steel for Case Hardening

Society of Automotive Engineers. 1931 Handbook. Carbon Steels; 1929. Chemical composition requirements for 13 grades, including 1 grade suitable for casehardening.

References.—Standard sizes, marking of type. *See* 603.0. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals, size and weight tolerances. *See also* 600.2, 600.7. Alloy steel for casehardening. *See* 621.31.

603.23 Commercial Grade Steel Bars and Rods

American Society of Mechanical Engineers. Boiler Construction Code. Section II. Specifications for Steel Bars; 1930. Chemical composition, tension and bend test requirements, permissible variation in gage. Based on A. S. T. M. Spec. A 7–24. *See* 605.11.

American Society for Testing Materials. A 107–30; 1930. Commercial Quality Hot Rolled Bar Steels. Covers carbon steel rounds, squares and hexagons of all sizes and flats not over 6 inches wide. Chemical compositions and tests for 21 grades of open-hearth, bessemer, and screw steel, permissible variation in dimensions.

American Society for Testing Materials. A 108–30; 1930. Commercial Cold-Finished Bar Steels and Cold-Finished Shafting. Covers rounds, squares, and hexagons of all sizes, and flats and shafts up to 6 inches. Chemical composition and tests for 8 grades of open-hearth, 1 of bessemer, and 2 of screw steel, permissible variations in dimensions.

Association of American Steel Manufacturers. Commercial Quality Bar Steel; 1924. For hot rolled carbon steel bars, chemical composition requirements, check analyses, allowable variations in sizes of bars.

References.—Standard sizes, marking of type. *See* 603.0. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals, size and weight tolerances. *See also* 600.2, 600.7. Structural grades. *See also* 605.1.

603.24 Steel for Shafts, Axles, and Forgings

American Society for Testing Materials. A 108–30; 1930. Commercial Cold-Finished Bar Steels and Cold-Finished Shafting. Covers rounds, squares, and hexagons of all sizes, and flats and shafts up to 6 inches. Chemical composition and tests for 8 grades of open-hearth, 1 of bessemer, and 2 of screw steel, permissible variations in dimensions.

Association of American Steel Manufacturers. Special Forging Quality Bar Steel; 1924. For hot rolled carbon steel bars, chemical composition requirements, check analysis, permissible variations in composition and dimensions.

Society of Automotitve Engineers. 1931 Handbook. Carbon Steels; 1929. Chemical composition requirements, for 13 grades, including grades suitable for forged, machined, or cold worked parts for automotive uses.

References.—Other steels of forging quality. *See* 611.51 and specifications of commodities made of forged steel. Standard sizes, marking of type. *See* 603.0. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals, size and weight tolerances. *See* 600.2, 600.7. Forged steel, forged steel shafts and axles. *See* 611.51, 611.52. Alloy steel for forgings, forged alloy steel and axles. *See* 621.31, 622.6.

603.25 Steel Reinforcing Bars and Rods

References.—Reinforcement steel. *See* 605.25.

603.26 Steel Bars and Rods for Welding

American Electric Railway Engr. Assn. W46–30; 1930. Welding Rod. For plain uncoated steel arc welding rod, for 3 grades dependent on content of carbon, requirements on chemical composition, tolerances on dimensions, standard sizes, general quality, welding test.

References.—Methods of testing and general requirements for metals. *See also* 600.1. Welding apparatus and practice. *See* 767. Iron and carbon steel welding wire. *See* 603.41 Cast-iron rod for welding. *See* 611.19. Brass rod, aluminum rod, for welding. *See* 645.11, 631.31.

603.27 Steel Bars and Rods for Automotive and Railway Use

American Electric Railway Engr. Assn. Recommended Specification. W104–28; 1928. Approved by American Standards Assn. as tentative standard E10–1929. Specification for Materials for Use in the Manufacture of Special Trackwork. Includes rolled steel bars, chemical composition, tensile strength, and bend test requirements.

Society of Automotive Engineers. 1931 Handbook. Carbon Steels; 1929. Chemical composition requirements for 13 grades suitable for automotive uses.

References.—Steels suitable for railway and automotive uses. *See also* 603.21, 603.23, 603.24, 603.33. Structural steels for railway use. *See also* 605.1. Alloy steels. *See* 621.3. Standard sizes, marking of type. *See also* 603.0. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals, tolerances on size and weight. *See also* 600.2, 600.7.

603.3 SPRING AND TOOL STEEL BARS AND RODS

603.31 Drill Tool Steel Bars and Rods

603.32 Hand, High-Speed, and Machine Tool Steels

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stock; 1930. Report of committee recommending list of standard sizes to be carried in stock of flats, rounds, and squares of high-speed steel, and octagons, rounds, and squares of carbon tool steel.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Includes tool steel, chemical composition requirements.

American Society for Testing Materials. A 71–26; 1926. Carbon Tool Steel. Suitable for lathe and planer tools, drills and milling cutters, dies, etc. Permissible variations from chemical composition specified, method of sampling, tolerances in dimensions, the recommended practice for the heat treatment of plain carbon tool steel of the American Society for Steel Treating is included.

References.—Standard sizes, marking of type. *See* 603.0. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals, size and weight tolerances. *See also* 600.2, 600.7. Heat treatments. *See also* 600.5. Alloy tool steel. *See* 621.35.

603.33 Spring Steel Bars and Rods

American Electric Railway Engr. Assn. Recommended Specification. W104–28; 1928. Approved by American Standards Assn. as tentative standard E10–1929. Specification for Materials for Use in the Manufacture of Special Trackwork. Includes helical steel springs, chemical composition requirements for the spring steel bar stock.

American Railway Assn. Mechanical Division. Steel Bars, Carbon, for Railway Springs; 1917. Chemical analysis, permissible variation in gage for flats, rounds and squares, for elliptical and helical springs.

American Society for Testing Materials. A 14–27; 1927. Carbon Steel Bars for Railway Springs. Covers grade A for elliptical and helical springs, grade B for helical springs. Chemical composition and tests, permissible variations in dimensions. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 58–27; 1927. Carbon Steel Bars for Vehicle and General Purpose Springs. For two grades of steel, chemical composition and tests, permissible variations in dimensions.

American Society for Testing Materials. A 68–27; 1927. Carbon Steel Bars for Railway Springs with Special Silicon Requirements. Covers grade A for elliptical and helical springs, grade B for helical springs. Chemical composition and tests, permissible variations in dimensions.

Society of Automotive Engineers. 1931 Handbook. Carbon Steels; 1929. Chemical composition requirements for 13 grades, including 3 grades of spring steel.

References.—Standard sizes, marking of type. *See* 603.0. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals, size and weight tolerances. *See also* 600.2, 600.7. Heat treatments. *See also* 600.5. Alloy spring steels. *See* 621.34. Carbon steel springs. *See* 611.54.

603.4 IRON AND STEEL WIRE

603.40 General Items

U. S. Gov., Dept. of Commerce. Bureau of Standards. C67; 1918. Wire Gages. Combined tables of sizes of American (B. & S.) wire gage, steel wire gage, Birmingham (Stubs) wire gage, British standard wire gage, and metric wire gage, with diameters in mils, inches, and metric units, and cross section in square mils, square inches, and metric units.

603.41 Bare and Coated Iron and Steel Wire

American Bureau of Welding. Bulletin No. 2; 1921. Welding Wire Specifications and Folios. Chemical composition requirements, uses, and recommended sizes for iron and steel bare electrodes, for iron and steel gas welding rods, for coated or covered electrodes not including chemical composition of coating, for gas welding rods for welding high carbon steels, nonferrous metals and mild steel.

American Railway Assn. Mechanical Div. Recommended Practice; 1924. Welding Wire and Rods. Two classes of wire for gas or electric welding of wrought iron and cast or wrought steel. Chemical compositions, dimensions and tolerances.

American Society for Testing Materials. A 82–27; 1927. Cold-Drawn Steel Wire for Concrete Reinforcement. For wire of gages 0.080 to 0.625 inch. Tension and bend test requirements, permissible variations in gage.

U. S. Gov., Federal Specifications Board. 174; 1924. Welding Wire, Iron and Steel. For bare iron and steel electrodes in 4 grades dependent on amount of carbon, for plain iron and steel gas welding wire in 3 grades dependent on carbon content, for cast iron welding rod in one grade, for welding low and high carbon steels, nickel steel and cast iron. General physical quality and adaptability requirements, chemical composition requirements.

References.—Iron and steel welding rod. *See also* 603.26, 611.19, 622.4. Alloy steel welding wire. *See* 622.4. Fence wire. *See also* 603.43. Telephone, telegraph, signal, track bonding wire of iron or steel. *See* 715.43. Methods of testing, general requirements for metals. *See also* 600.1. Wire gages. *See also* 603.40. Zinc coatings and tests. *See also* 600.3.

603.42 Bare and Coated Wire Rope

American Assn. of State Highway Officials. Tentative Specification. M–30; 1927. Wire Rope and Fittings for Highway Guard Rail. For ¾-inch and 1-inch steel rope, requirements on weight and testing of galvanizing, construction, lay, and tensile strength of rope, dimensions, threading, galvanizing and tensile strength of forged eye bolts, sampling and testing in accordance with A. A. S. H. O. methods.

American Assn. of State Highway Officials. Tentative Method. T–39. Undated. Methods of Tests for Wire Rope (Guardrail). Definitions of lay and diameter of wire rope, requirements on method of preparation of tension test specimen, attachment of socket and tension test procedure.

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steel wire ropes. Requirements on breaking strength for various sizes and strandings of wire rope for stream cables, towlines, hawsers, and warps, and for wire rigging.

American Electric Railway Engr. Assn. Recommended Specification. D102–29; 1929. Overhead Line Materials for Direct and Catenary Suspension. Includes 7 strand steel guy and messenger cable, requirements on factor of safety when using, galvanized strand to conform to A. S. T. M. spec. A122.

American Marine Standards Committee. H No. 9–1926. Wire Rope Sockets. Dimensioned drawing for wrought steel sockets, 18 standard sizes of open and closed types, strength requirements of material.

American Marine Standards Committee. H No. 10–1926. Solid Thimbles for Wire Rope. Dimensioned drawing for cast iron thimbles, 19 standard sizes.

American Marine Standards Committee. H No. 11–1926. Open Thimbles for Wire Rope. Dimensioned drawing for wrought steel thimble for 24 standard sizes.

American Marine Standards Committee. O No. 25–1930. Standard Wire Ropes for Marine Uses. For 4 strength grades of cast steel and plow steel rope, uncoated and galvanized, constructions and their ordinary uses for 10 standard ropes, including fiber cored, marline clad types, sash and bell cord, requirements on weight, breaking strength, lay, strand fabrication, tolerance on diameter, torsional and wrapping test and test for galvanizing for various sizes of each type, recommended practice on storing, handling, and use.

American Mining Congress, sponsor, American Standards Assn., M 11–1927. Wire Rope for Mines. Types, material grades according to strength, torsional and wrapping test requirements, galvanizing, fiber core and lubrication requirements, weight, minimum strength, and construction of the various grades of rope, and recommended practice in the use of wire rope at mines, clamping, seizing, socketing, splicing, drums and sheaves, lubrication, safety factor.

American Petroleum Institute. Standard No. 9–A; 1931. Wire Rope. For plow steel, extra strong cast steel, and cast steel grades of wire rope, requirements on tension, elongation, torsion, and bend tests of wire, and strength test of full sized rope, tolerances on manufacture, lubrication, directions for attaching sockets, breaking strength and galvanizing test for galvanized guy strand. Wire rope for oil drilling lines.

American Railway Assn. Signal Section. 4714; 1914. Galvanized Messenger Wire. Seven-strand wire cable, general quality and diameter of wire, diameter, area, strength, elongation, lay, weight, wrapping test requirements for 3 sizes of cable, galvanizing according to Signal Section specification 2912.

American Railway Assn. Telegraph and Telephone Section. 1–A–17; 1927. Galvanized Steel Guy and Messenger Strand. For 7-strand cable, dimensions, lay, and tensile strength requirements for 4 sizes of cable, galvanizing according to A. R. A. specifications 1–D–5.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Includes wire rope and attachments, stranding and size limits for plow steel around hemp center, allowable stress in forged steel sockets, tensile strength, elongation, wrapping, and repeated bending test requirements for wire, strength test requirements for rope and sockets.

American Society for Testing Materials. A 122–30; 1930. Zinc Coated (galvanized) Steel Wire Strand suitable as guy wire, messenger wire, span wire, etc. Zinc according to A. S. T. M. specifications B 6, requirements on weight and uniformity of zinc coating using A. S. T. M. test method A 110, construction of strand, weight, size of wires, breaking strength, and elongation requirements.

National Electric Light Assn. Suggested Specifications. D300–22; 1922. Thimble. — D308–22; 1922. Eye Nut. — D309–23; 1923. Clevis. Dimensions and allowable variations for 3 sizes of steel thimbles, one size each of forged steel eye nut and steel clevis, material according to N. E. L. A. specifications D200–22, galvanizing according to D210–22. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications. D308–22. Eye Nut. Dimensions of one size of forged steel eye nut threaded for connection to rod or cable, permissible variations in dimensions, material according to N. E. L. A. specifications D200–22 and D209–22, galvanizing according to D210–22. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications. D650–28T; 1928. Tentative. Galvanized Steel Strand. For 7-strand cable, sizes ¼ to ½-inch, requirements on size and permissible variations of individual wires, on weight of cable, breaking strength for 4 grades, (standard, siemens martin, high strength, extra-high strength), pitch, lay, bending test, galvanizing according to N. E. L. A. spec. D210.

National Electric Light Assn. Suggested Specifications. D660–28T; 1928. Tentative. Copper Covered Steel Strand. For 7 sizes of 7-strand cable, standard and extra-high strength, requirements on size of wires, weight of cable, tensile strength and elongation, pitch and lay, conductivity, ferroxyl test for copper coating, test of adhesion of copper to steel.

Society of Automotive Engineers. 1931 Handbook. Shackles, Aeronautic; 1928. Dimensions of shackles for various strengths up to ½-inch bolt hole size.

Society of Automotive Engineers. 1931 Handbook. Recommended Practice. Steel Thimbles. Aeronautic; 1918. Dimensions of galvanized thimbles for wire cable 9/16 to ⅜-inch diameter.

U. S. Gov. Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Wire Cable Guardrail. For cable for guardrail, requirements on general quality of wire, method of applying and test for amount of galvanizing, for 7 wire ¾-inch cable, requirements on stranding and lay, size of wire, minimum strength of cable.

U. S. Gov., Federal Specifications Board. 297; 1925. Wire Rope. Covers 19 types of wire rope and seizing strand, uncoated and galvanized, made from five grades of steel and one grade of phosphor bronze. Strength requirements of wires, torsional, wrapping and galvanizing test requirements for wires, construction, dimensions, weight, breaking strength, safe working load, and recommended sizes of sheaves or drums, information on handling, application of seizing and sockets and clips, care and uses.

References.—See references under 603.43.

603.43 Manufactures of Iron and Steel Wire

American Railway Engineering Assn. 1929 Manual. Standard Right-of-Way Fences; 1926. Covers 2 types of steel smooth wire fencing, 1 type of combined woven and barbed wire fence, and 1 type of ribbon, smooth wire or barbed wire fence. Gage and spacing of longitudinal and stay wires, strength, winding, and galvanizing requirements, material and dimensions of wood posts and of staples, erection of fence, recommended types of farm gates.

American Society for Testing Materials. A 116–30; 1930. Zinc Coated (Galvanized) Farm-Field and Railroad Right-of-Way Wire Fencing. Requirements on weight and uniformity of zinc coating using A. S. T. M. method of test A 110, permissible variations from nominal wire sizes, recommends styles and sizes of fence fabrics given in Simplified Practice Recommendation No. 9 of U. S. Dept. of Commerce.

American Society for Testing Materials. A 117–30; 1930. Zinc Coated Chain Link Fence Fabric Galvanized after Weaving. Pickets are helically wound and interwoven into a link fabric without knots or ties, usual wire and mesh sizes and heights of fence, zinc according to A. S. T. M. specifications B 6, weight and uniformity of zinc coating tested according to A. S. T. M. method A 110.

American Society for Testing Materials. Tentative Specifications. A 118–30T; 1930. Zinc Coated Chain Link Fence Fabric Galvanized before Weaving. Pickets are helically wound and interwoven into a link fabric without knots or ties. Usual wire and mesh sizes and heights of fence, zinc according to A. S. T. M. specifications B 6, requirements on weight and uniformity of zinc coating, tests in conformity with A. S. T. M. method A 110, for farm field fence wire and for railroad right-of-way fence wire.

American Society for Testing Materials. A 121–30; 1930. Zinc Coated (Galvanized) Barb Wire. For wire coated before or after fabrication, zinc according to A. S. T. M. specifications B 6, usual sizes and construction of barb wire, requirements on weight and uniformity of coating using A. S. T. M. test method A 110, size tolerance.

American Society for Testing Materials. E 11–26; 1926. Sieves for Testing Purposes. Construction requirements, table of sieve openings and wire diameters with permissible variations, methods of testing sieves, for brass, bronze or other suitable wire sieves.

Society of Automotive Engineers. 1931 Handbook. Wire Cloth; 1924. For mesh sizes 8 to 200, diameter of wire and size of opening, tolerance in spacing and size of wire, materials as specified by purchaser, usually steel or brass up to 80 mesh and phosphor bronze or monel metal above that size.

U. S. Gov., Dept. of Commerce. Bureau of Standards R9–28; 1928. Woven Wire Fencing. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes and varieties of field fence, close-mesh hog and cattle field fence, wolf-proof fence, and poultry fence, with heights, weave, sizes and spacing of wires.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R122–31; 1931. Wire Insect Screen Cloth. Simplified practice recommended and accepted by industry establishing a limited number of stock varieties of black painted and electro-galvanized steel wire screen cloth and of copper and commercial bronze wire screen cloth, includes standard mesh openings, sizes of wire, widths of roll, length of roll, packing, required percentage of copper for copper and bronze screen wire.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders Hardware, Nontemplate. Ceiling Hook, Coat and Hat Hooks, Hooks and Eyes. Dimensions and illustrated construction of hooks made from steel wire.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders Hardware, Nontemplate. Hooks and Eyes. Four standard lengths of brass or steel wire hooks and screw eyes as illustrated.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. Single Jack Chain, Double Jack Chain, Ladder Chain, Register Chain, Flat Lock Link Chain, Single Jack Lock Link Chain. Wire gage, links per foot, weight, tensile strength requirements for several sizes of each type.

U. S. Gov., Federal Specifications Board. RR–F–221; 1930. Wire Fencing, Barbed, Netting, and Woven Wire, Black and Galvanized. For zinc coated barbed wire, for black or zinc coated woven wire farm or field fencing, and for zinc coated wire netting, requirements on size of wire, spacing of barbs, sizes of mesh and width of netting, woven wire fencing to conform to sizes in R9 of Nat. Bureau of Standards, required weight and dip of coating, methods of sampling and testing of coating, also in conformity with F. S. B. spec. 339a for metals and 91a for zinc.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Zinc coatings and tests. *See also* 600.3. Wire lath. *See* 605.24. Wire fabric for concrete reinforcement. *See* 605.25. Motorcycle spokes. *See* 725.2. Bed springs and wire fabric for beds. *See* 613.1.

603.5 CHAINS AND ATTACHMENTS

603.50 General Items

U. S. Gov., Dept. of Commerce. Bureau of Standards. R100–29; 1929. Welded Chain. Simplified practice recommended and accepted by industry in which the sizes and varieties listed in the publication are eliminated from the list of stock items formerly provided, including sizes of straight link proof coil and BB chain, breast chains, cart back chains, trace chains, wagon chains, chain dogs, ring dogs, heel chains, etc.

603.51 Long-Link Chains

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Long Link Coil Chain. Covers buoy or submarine net chain of wrought iron and conveyor or sprocket-wheel chain of iron or steel. Chemical composition of iron or steel, proof and breaking load test requirements, dimensions and weight for sizes up to 2-inches.

References.—Methods of testing, general requirements for metals. *See also* 600.1.

603.52 Short Link, Straight-Link Chains

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Chains. For wrought iron or steel unstudded short link chain, requirements on breaking test, proof test, and weight for various sizes.

American Marine Standards Committee. H No. 14–1926. Railroad Iron Sling for Cargo Handling Gear for Ships. Dimensional drawing of standard size, to be in conformity with Am. Bureau of Shipping specifications for chains.

American Marine Standards Committee. H No. 15–1926. Chain Sling for Cargo Handling Gear for Ships. Dimensional drawing of standard size, to be in conformity with Am. Bureau of Shipping specifications for chains.

American Railway Assn. Mechanical Div. Recommended Practice. Chain; 1930. For 2 classes of chain; crane chain for slings, hoists, steam shovels, where an all iron chain is desired; proof coil for railroad cars and construction work.

Crane chain of wrought iron without scrap or steel, proof coil of iron or steel, requirements on construction, chemical composition, proof, tension, and etch tests, standard weights and dimensions.

American Society for Testing Materials. A 56–30; 1930. Iron and Steel Chain. Covers 2 grades; crane chain of wrought iron for slings, hoists, steam shovels, and marine uses; and proof coil of wrought iron or steel for railroad cars, construction and forestry work. Construction, chemical composition and test requirements, proof and break test requirements, nominal weights and dimensions.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Close Link Coil Chain. Class I for slings, cranes, hoists, steam shovels, and marine uses, and where an all-iron chain is desired, Class II for ordinary slings and hoists, Class III for general service. Chemical composition of iron and of steel, proof load and breaking load test requirements, for sizes up to 2 inches.

References.—Standard sizes and varieties. *See also* 603.50. Methods of testing, general requirements for metals. *See also* 600.1. Heat treatments. *See also* 600.5. Classification of metals. *See* 600.2.

603.53 Stud-Link Chains

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Chains. For stud link chains of wrought iron or steel or of cast steel, requirements on dimensions and tolerances, weight, breaking test, and proof test for various sizes.

American Society for Testing Materials. Tentative Specifications. A 77–28T; 1928. Electric Cast Steel Stud Link Anchor Chain. Proof and break test requirements for chain links, swivels, shackles, etc., dimensions and permissible variations for links, end links, swivels, shackles, and shackle pins.

U. S. Gov., Federal Specifications Board. 171a; 1926. Chain, Ship. Covers 3 grades, all iron forged, forged steel, and commercial grade chain of stud link type for anchor, mooring, buoy, and towing chain. Manufacture, annealing, finish of chain, chemical composition and tensile test requirements for iron or steel used, dimensions, weight and tolerances of common links, enlarged links, and end links, proof load and breaking load test requirements for 48 sizes of chain, to conform to F. S. B. spec 339 for metals.

References.—Standard sizes and varieties of chain. *See also* 603.50. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals. *See* 600.2. Heat treatments. *See also* 600.5.

603.54 Twisted-Link Chain

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Twist Link Chain. One grade for ordinary slings and hoists. Dimensions and weight for sizes ¼ to ⅝, breaking load and elongation test requirements, chemical composition requirements for iron or steel.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Twist Link Coil Chain (Liberty Pattern). Common coil chain for general service. Dimensions, weight, and minimum tensile strength, for sizes up to $\frac{5}{16}$.

References.—Standard sizes and varieties. *See also* 603.50. Methods of testing, general requirements for metals. *See also* 600.1.

603.55 Straight and Twisted Link Vehicle Chain

References.—Standard sizes and varieties of chain. *See also* 603.50. Vehicle and harness hooks. *See* 603.57.

603.56 Weldless Chain, Various Link Patterns

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS22–30; 1930. Builders' Hardware (Nontemplate). Transom Chains. Types selected and accepted by industry as standard, with type of plate and material and length of chain.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. Ladder Chain, Register Chain. Wire gage, links per foot, tensile strength, and weight for several sizes of steel and of brass chains of each type.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. Lock Link, Flat; Lock Link, Single Jack, Chains. Made from steel, copper, brass, or bronze wire. Dimensions, weight, and tensile strength of 14 sizes of steel chain of each type and of one size of brass single jack lock link chain.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. Single Jack Chain, Double Jack Chain. Wire gage, links per foot, tensile strength, and weight for several sizes of steel and brass chains of each type.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. For steel and bronze sash chain; steel flat link, of short pitch and long pitch, chain; for brass and aluminum safety chain; and for steel and copper plumbers chain; sheet metal gage, links per foot, weight and tensile strength of various sizes.

References.—Standard sizes and varieties. *See also* 603.50. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals. *See* 600.2. Transom chain. *See also* 617.5.

603.57 Chain Attachments

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Chain Shackles. For D shackles and anchor shackles F, requirements on dimensions of shackle and pin for various sizes of chain, breaking test, and proof test for wrought iron or steel and for cast steel shackles.

American Society for Testing Materials. Tentative Specifications. A 77–28T; 1928. Electric Cast Steel Stud Link Anchor Chain. For swivels, shackles, and shackle pins, proof and break test requirements, dimensions and permissible variations.

U. S. Gov., Federal Specifications Board. 171a; 1926. Chain, Ship. Shackles, D. Chemical composition and tensile test requirements of material, manufacture, dimensions and tolerances of shackle and pin, illustrated, to conform also to F. S. B. Spec. 339 for metals.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Chain Dogs, Ring Dogs. Chemical composition of steel, dimensions of chain links and end links, dimensions of dog, for various patterns as illustrated.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Drop Forged Connecting Links, Repair or End Lap Links, Lap Rings, Oval Side Lap Links. Dimensions and weight for various sizes of metal, tensile strength of connecting links.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Rings. Chemical composition of steel, dimensions and weight for many sizes of rings.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Shackles. Screw Pin Anchor Shackles, Screw Pin Chain Shackles, Oval Pin Anchor Shackles, Oval Pin Chain Shackles, Round Pin Anchor Shackles, Round Pin Chain Shackles. Dimensions, size of pin, estimated weight for many sizes of each type of forged steel shackles.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Sheared Toggles, Forged Toggles. Chemical composition of steel, dimensions of toggle and inside diameter of ring for toggles for various chain sizes.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Slip Hooks, Grab Hooks, Hoist or Sling Hooks, Bale Hooks and Box Hooks, Barrel Hooks and Stone Hoist Hooks, Hogshead Hooks, Can Hooks. Dimensions of various sizes with approximate weights of some of the above classes of steel hooks as illustrated.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Swivels. Dimensions and weight of malleable iron swivels for 6 chain sizes.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Vehicle and Harness Hooks. Forged steel long slip pattern for stay chains. Dimensions, and weight for 4 sizes.

References.—Standard sizes and varieties of chain. *See also* 603.50. Methods of testing, general requirements for metals. *See also* 600.1. Heat treatments. *See also* 600.5.

603.59 Miscellaneous Chains

References.—Roller chain, silent transmission chains. *See* 766.1.

603.6 HORSESHOES

References.—Standard shoe for horseshoe pitching. *See* 943.5.

604. IRON AND STEEL PLATES AND SHEETS

604.0 GENERAL ITEMS

U. S. Gov., Congress. 27 Stat. L., 746, approved Mar. 3, 1893. An act establishing a standard gage for sheet and plate iron and steel. Table of sheet and plate thicknesses corresponding to standard gage numbers. Reprinted in Circ. 391 of Bureau of Standards of Dept. of Commerce.

U. S. Gov., Dept. of Commerce. Bureau of Standards C391; 1931. Standard Thicknesses, Weights, and Tolerances of Sheet Metal (Customary Practice). For iron and steel sheet and plate, U. S. standard gage, table showing gage number and corresponding sheet thicknesses and weights. Established by an act of Congress (27 Stat. L., 746) approved Mar. 3, 1893, an Act establishing a standard gage for sheet and plate iron and steel. Permissible variations in weight and thickness of plates and sheets.

604.1 IRON AND STEEL PLATES

604.10 General Items

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Blue Annealed Steel Sheets (or Tank Steel). Dimensions of recommended standard sizes, No. 8 to No. 16 gage.

Assn. of American Steel Manufacturers. Standard Permissible Variations in Gage Weight, Gage Thickness, Size, and Flatness of Sheets and Light Plates Blue Annealed; 1929.

604.11 Steel Plates for Pressure Vessels

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steel plates for boilers. For shell plates and for plates for flanging or welding, requirements on tension test and bend test.

American Marine Standards Committee. E No. 27–1929. Marine Boiler Steel Plates. For two grades of steel, chemical composition, tension, and bend test requirements, permissible variations in weight and thickness.

American Railway Assn. Mechanical Div. Steel, Boiler, and Firebox, for Locomotive Equipment; 1925. Chemical analysis, tension, bend, and homogeneity test requirements, permissible variation in weight and thickness.

American Society of Mechanical Engineers. Boiler Construction Code. Section II. Material Specifications; 1930. Specifications for Steel Boiler Plate. For flange and firebox plate, chemical analysis, tension, bend, and homogeneity test requirements, permissible variation in dimensions. Identical with A. S. T. M. specifications for boiler and firebox steel for stationary service, A 70–27.

American Society for Testing Materials. A 30–24; 1924. Boiler and Firebox Steel for Locomotives. Covers flange and firebox steel. Chemical composition and tests, tension, bend and homogeneity test requirements, permissible variation in weight and thickness. Available in Spanish and Portuguese from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 70–27; 1927. Boiler and Firebox Steel for Stationary Service. For flange and firebox steel, chemical composition and tests, tension, bend and homogeneity test requirements, permissible variation in weight and thickness.

American Society for Testing Materials. A 89–30; 1930. Steel Plates of Flange Quality for Forge Welding. For welding without the use of fluxes. For 2 grades of steel, chemical composition and tests, tension and bend test requirements, permissible variations in weight and thickness.

American Society for Testing Materials. Tentative Specifications. A 89–31T; 1931. Steel Plates of Flange and Firebox Qualities for Forge Welding. For 2 grades of each of flange quality and firebox quality steel, requirements on chemical composition, tension test and elongation, bend test, and homogeneity, permissible overweights of plates ordered to thickness.

American Society for Testing Materials. Tentative Specifications. A 114–29T; 1929. Marine Boiler Steel Plates. Covers 2 grades dependent on strength, chemical composition, tension and bend test requirements, permissible variations in thickness and weights.

American Society for Testing Materials. Tentative Specifications. A 129–30T; 1930. Open-Hearth Iron Plates of Flange Quality. For 3 types, requirements on chemical composition, tension tests, bend tests, permissible variations in weight and thickness from ordered amounts.

Assn. of American Steel Manufacturers. Structural and Boiler Steel; 1922. Includes firebox and flange steel for boilers, chemical composition, tension, and bend test requirements, permissible variations in thickness of plates.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Boiler Plate. For construction and repair of boilers on steam vessels, mandatory requirements on chemical composition, tensile and bend test.

U. S. Gov., Federal Specifications Board. 549; 1928. Steel Plates, Marine Boiler. Classes A and B of open-hearth steel for use where forming or flanging is required, class C of Bessemer steel for smokestacks, uptakes, where strength not required. Chemical composition, tension test, bend test requirements for classes A and B, physical appearance and permissible variations in dimensions of all classes.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals. *See* 600.2. Standard thicknesses. *See* 604.0. Standard sheet sizes, tolerances on weight and thickness. *See also* 604.10. Power boilers, water heaters, tanks. *See also* 703., 614., 605.23, 956.2.

604.12 Steel Plates for Nonpressure Tanks and Stacks

U. S. Gov., Federal Specifications Board. 549; 1928. Steel Plates, Marine Boiler. Classes A, B, and C. Class C of Bessemer steel for smokestacks, uptakes, and where strength is not required. Of best commercial quality, physical appearance requirements, permissible variations in dimensions.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals. *See* 600.2. Standard thicknesses. *See* 604.0. Standard sheet sizes, tolerances on weight and thickness. *See also* 604.10. Alloy steel plates for tank cars. *See* 621.32. Steel tanks. *See* 605.23, 956.2, 726.1.

604.13 Steel Plates for Ship Hulls

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Iron plates and angles. Requirements on tension and cold bend tests.

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steel Plates. Tension test and bend test requirements.

American Society for Testing Materials. A 12–21; 1921. Structural Steel for Ships. Chemical composition and tests, tension and bend test requirement, permissible variations in weight and thickness for plates. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

Assn. of American Steel Manufacturers. Structural and Boiler Steel; 1922. Includes class A for ships, cars, etc., chemical composition, tension, and bend test requirements, permissible variations in weight.

U. S. Gov., Federal Specifications Board. 469; 1927. Structural Steel for Ships Other than Naval Vessels. Chemical composition, tension test, and bend test requirements, permissible variations in dimensions and weight of plates and shapes.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals. *See* 600.2. Standard thicknesses. *See* 604.0. Standard sheet sizes, tolerances on thickness and weight. *See also* 604.10. Other structural steel for ships. *See* 605.15.

604.14 Wrought-Iron Plates

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Iron plates and angles. Requirements on tension and cold bend tests.

American Society for Testing Materials. A 42–30; 1930. Approved by American Standards Assn. as G13–1931. Wrought-Iron Plates. Tension and bend test requirements for 2 grades of material. 1918 edition of this specification is available in Spanish and in French from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals. *See* 600.2. Standard thicknesses. *See* 604.0. Standard sheet sizes, tolerances on weight and thickness. *See also* 604.10.

604.19 Miscellaneous Iron and Steel Plates

American Society of Mechanical Engineers. Boiler Construction Code. Section II; 1930. Specifications for Steel Plate for Brazing. Chemical analysis, tension and bend test requirements.

American Society for Testing Materials. A 78–30; 1930. Steel Plates of Structural Quality for Forge Welding. Chemical composition and tests for 2 grades of steel, tension and bend test requirements and permissible variation in weight and thickness.

References.—For plates classifiable under sheets. *See* 604.2. Structural carbon steel plates. *See also* 605.1. Structural alloy steel plates. *See* 621.32. Methods of testing, general requirements for metals. *See also* 600.1. Standard thicknesses. *See* 604.0. Standard sheet sizes, tolerances on weight and thickness. *See also* 604.10.

604.2 IRON AND STEEL SHEETS

604.20 General Items

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Light Sheet Steel And Iron. Dimensions of recommended standard sizes of galvanized steel sheets, one pass-cold rolled box annealed sheets, and jacket steel.

Assn. of American Steel Manufacturers. Standard Permissible Variations in Gage Weight, Gage Thickness, Size, and Flatness of Sheets and Light Plates Blue Annealed; 1929.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R28–29; 1929. Sheet Steel. Simplified practice recommended and accepted by industry establishing a limited list of stock sizes of steel sheets in various gages, for galvanized flat sheets, one-pass cold-rolled box annealed sheets, and blue annealed sheets.

604.21 Iron and Steel Sheets for Magneto Electric Apparatus

604.22 Iron and Steel Strips, Bands, and Hoops

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation, Tank Hoops; 1920. Quality and strength of the wrought iron or steel according to A. R. E. A. specifications for steel railway bridges, minimum size, allowable stress, and spacing of hoops of circular section, design of hoop lugs, safe working loads for hoops.

American Society for Testing Materials. Tentative Specifications. A 109–27T; 1927. Cold Rolled Strip Steel. Covers 5 grades from hard to dead soft temper, for blanking, bending, forming, spinning and deep drawing. Chemical composition, tension and bend test requirements, permissible variations in specified dimensions.

Associated Cooperage Industries of America. Steel Hoops, Width and Gage, for Tight Barrels and Kegs, other than I. C. C. Barrels and Kegs; 1930. Standard dimensions of head hoop, quarter hoop, and bilge hoop for various capacity kegs and barrels.

Society of Automotive Engineers. 1931. Handbook. Steel Bands and Strips; 1911. Widths and corresponding ranges in thickness for widths up to 9⅝ inches.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Shipping Container Spec. 10A. Wooden Barrels and Kegs (Tight). For steel hoops, requirements on carbon content of steel, strength and elongation, number and sizes of hoops for various sizes of containers, mandatory for shipment of dangerous articles.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Standard thicknesses. *See* 604.0. Standard sheet sizes, tolerances on weight and thickness. *See also* 604.20. Barrels and tanks. *See* 951., 956.2. Barrel hoops. *See also* 421.3.

604.23 Iron and Steel Sheets for Drawing and Forming

American Society for Testing Materials. Tentative Specifications. A 109–27T; 1927. Cold Rolled Strip Steel. Covers 5 grades, hard, half hard, quarter hard, planished, and dead soft temper, used for blanking, bending, forming, spinning and deep drawing. Chemical composition requirements, tension and bend test requirements, permissible variations in dimensions.

References.—See references under 604.22.

604.24 Spring and Tool Steel Sheets

604.25 Iron and Steel Sheets for Automotive and Railway Use

American Railway Assn. Mechanical Div. Recommended Practice; 1926. Steel Sheets and Thin Plates. For plates less than $\frac{3}{16}$ inch thickness. Chemical analysis, bend test requirements, permissible variations in weight, thickness and size.

References.—Other iron and steel sheets for automotive and railway use. *See* 604.22 and 604.23. *See* references under 604.22.

604.29 Iron and Steel Sheets for Miscellaneous Purposes

American Assn. of State Highway Officials. Tentative Specification M–36. Undated. Base Metal for Corrugated Metal Sheets for Culverts. Chemical composition requirements for pure iron, copper bearing pure iron, copper iron, copper molybdenum iron, copper steel, tolerances on check analysis.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R78–28; 1928. Iron and Steel Roofing. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes, covering widths, lengths, gage thicknesses, and weights for galvanized sheets and painted sheets, corrugated, roll, V-crimp, and pressed standing seam types.

References.—Tin and zinc coated sheets. *See also* 604.3. For sheets classifiable under plates. *See also* 604.1. Structural carbon and alloy steel sheets and plates. *See* 605.1, 621.32. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals. *See* 600.2. Standard thicknesses. *See* 604.0. Standard sheet sizes, tolerances on weight and thickness. *See also* 604.20.

604.3 TIN COATED AND ZINC COATED SHEETS

604.31 Tin-Coated Sheets (Roofing Tin, Terneplate)

U. S. Gov., Dept. of Commerce. Bureau of Standards. C391; 1931. Standard Thicknesses, Weights, and Tolerances of Sheet Metal (Customary Practice). Tin Plate Gage. For gage dependent on pounds per base box, table of trade symbols and corresponding weight and approximate thickness for gage established by custom, permissible variations in weight. Includes tin plate, terne plate, roofing tin and terne.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R30–28; 1928. Roofing Ternes. Simplified practice recommended and accepted by industry establishing a limited list of standard weights of terne plate and a minimum thickness.

U. S. Gov., Federal Specifications Board. QQ–T–201; 1930. Terneplate, Roofing Tin. For prime sheets only, requirements on general quality of the black sheets and of coated sheets, chemical composition of the iron or steel base metal, heat treatment and pickling, chemical composition of coating, weight of sheets before and after coating, for 6 weights of coating on 6 base metal weights, methods of testing, in conformity also with F. S. B. spec. 339 for metals.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Coatings and tests of coatings. *See also* 600.3. Standard sheet sizes, tolerances on weight and thickness. *See also* 604.20.

604.32 Zinc-Coated (Galvanized) Steel Sheets

American Railway Assn. Mechanical Division. Recommended Practice; 1923. Galvanized Sheets. Galvanized steel and iron and copper bearing sheets. Chemical composition of copper bearing sheets, weight and dimensions of galvanized sheets and coating, bend and coating test requirements, permissible variations in dimensions.

American Society for Testing Materials. A 93–27; 1927. Approved by American Standards Assn. as G8b1–1931. Zinc Coated (Galvanized) Sheets. Covers steel and open-hearth iron with 5 classes of zinc coatings applied by hot-dip process dependent on thickness of coating and amount of bending required. Weight of coating and bend test requirements, permissible variations in dimensions and weight. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

U. S. Gov., Dept. of Commerce. Bureau of Standards C 391; 1931. Standard Thicknesses, Weights, and Tolerances of Sheet Metal (Customary Practice). Galvanized sheet gage. Table of gage numbers with corresponding weights of finished sheet, as established by custom, tolerances on weights.

U. S. Gov., Dept. of Commerce. Bureau of Standards R 78–28; 1928. Iron and Steel Roofing. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes, covering widths, lengths, gage thicknesses, and weights for galvanized sheets and painted sheets, corrugated, roll, V-crimp, and pressed standing seam types.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Coatings and tests of coatings. *See also* 600.3 Standard sheet sizes, tolerances on weight and thickness. *See also* 604.20.

605. STRUCTURAL IRON AND STEEL

605.0 GENERAL ITEMS

American Institute of Architects. Document No. 172; 1927. A Filing System for Architects' Offices. Includes a standard classification of construction materials with numbers assigned to headings and subheadings, primarily for filing of advertising matter.

American Institute of Steel Construction. Code of Standard Practice; 1929. Classification of material, practice on use of drawing weights, drawings and specifications, workmanship, inspection, erection, delays and extra work, proposals and contracts.

605.1 STRUCTURAL SHAPES AND PLATES, NOT FABRICATED

605.11 Structural Steel for Bridges

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Eyebars. Material in conformity with A. S. T. M. Spec. A 7–24 for structural steel for bridges, tension test requirements for full size tests of eyebars.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Steel Railway Bridges; 1924. Includes structural and rivet steel specifications. Agrees with specification A7–24 of American Society for Testing Materials except for permissible variations in weight of plates.

American Society for Testing Materials. A 7–29; 1929. Structural Steel for Bridges. Chemical composition, tension, and bend test requirements for structural and rivet steel, permissible variations in cross section and weight, and of thickness of plates.

Association of American Steel Manufacturers. Structural and Boiler Steel; 1922. Includes Class A steel for railway bridges, ships, cars, etc., chemical composition, tension and bend test requirements, permissible variations in weight.

National Electric Light Assn. Suggested Specifications D 200–22; 1922. Steel (Material). To comply with A. S. T. M. specifications A7–21 covering structural steel for bridges, tension and bend test requirements. Published in 1924 N. E. L. A. Proceedings.

U. S. Gov., Federal Specifications Board. 351a; 1929. Steel, Structural, for Bridges. Covers 4 classes, structural steel, noncopper and copper, and rivet steel, noncopper and copper, suitable for railroad and highway bridges, large capacity cranes, and high radio towers. Chemical composition, tensile test, and bend test requirements, permissible variations in weight of plates and shapes and in dimensions of rods and flats from the ordered quantities.

References.—Alloy structural steel. *See* 621.31, 621.32, 621.33. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals. *See* 600.2. Zinc coatings for structural steel. *See also* 600.3. Tolerances on weight and thickness of plates and bars. *See also* 600.7. Standard thicknesses of sheets and plates. *See* 604.0. Standard sheet sizes. *See also* 604.10, 604.20. Rivet steel, rivets. *See also* 603.21, 608.4. Steel castings. *See also* 611.41. Steel bridges. *See also* 605.21.

605.12 Structural Steel for Buildings

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Structural Steel and Iron; 1929. Design rules, maximum unit stresses, maximum slenderness ratio, minimum depth ratio, minimum thicknesses of metal, general design, spacing of rivets, lacing for trusses, beams, columns, provision for expansion, materials according to A. S. T. M. specifications, finish and erection.

American Society for Testing Materials. A 9–29; 1929. Structural Steel for Buildings. Chemical composition, tension and bend test requirements for structural and for rivet steel, permissible variations in weight and cross section of shapes, and in weight and thickness of plates from quantities specified.

Association of American Steel Manufacturers. Structural and Boiler Steel; 1922. Includes class B steel for buildings, highway bridges, train sheds, etc., chemical composition, tension, and bend test requirements, permissible variations in weight.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R 94–30; 1930. Open Web Steel Joists. Simplified practice recommended and accepted by industry establishing for open web joists a standard symbol system, standard resisting moments, end reactions, and allowable uniform loading for various spans and for beam depth of 8 to 16 inches.

U. S. Gov., Federal Specifications Board. 352a; 1929. Steel, Structural, for Buildings. Class A, structural steel, noncopper; class B, structural steel, copper; class C, rivet steel, noncopper; class D, rivet steel, copper. Chemical composition, tensile test, and bend test requirements, permissible variations in weight of plates and shapes and variations in dimensions of rods and flats.

References.—Metal roofing material. *See also* 604.3. Steel buildings. *See also* 605.22. For other references *see* references under 605.11.

605.13 Structural Steel for Cars and Locomotives

American Railway Assn. Mechanical Div. Recommended Practice; 1923. Steel, Structural, Shapes, Plates, and Bars. For cars and locomotives. Chemical analysis, tension and bend test requirements, permissible variations in weight and dimensions.

American Railway Assn. Mechanical Div. Arch Bars, Column and Journal Box Bolts and Column Castings to be Used for Maintenance of Existing Arch Bar Trucks of 40 and 50 Ton Capacity; 1929. Dimensions and shape of arch bars and tie bars of wrought iron or mild steel for replacement of defective bars, dimensions of malleable iron or cast steel columns.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. Truck Bolsters. Design test requirements for freight bolsters with integral or separable center plate, of cast steel, structural steel, or forged iron or steel, in accordance with A. R. A. specifications for materials, maximum permissible stresses, test load requirements and permissible deflections.

American Railway Assn. Mechanical Div. Recommended Practice. Bolsters, Truck, Pressed Steel, for 80,000, 100,000 and 140,000 Pound Capacity Cars; Specifications and Tests for; 1915. Steel to conform to specifications and tests for structural steel for freight cars, limiting weights for various capacities.

American Railway Assn. Mechanical Div. Recommended Practice. Bolsters, Truck, Cast and Pressed Steel, Gages for. Three gages for each of 3 sizes of bolsters, dimensions and design.

American Railway Assn. Mechanical Div. Center Plate Gages; 1927. Dimensions and design of body center plate gage and truck center plate gage.

American Railway Assn. Mechanical Div. Center Plates; 1927. Standard dimensions of truck bolster center plate and of body bolster center plate.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. Coupler Yokes. Design test requirements for freight coupler yokes of horizontal or vertical plane types, material cast steel, structural steel, or forged iron or steel in accordance with A. R. A. specifications, requirements on minimum tension area, test requirements for maximum set and for breaking load.

American Railway Assn. Mechanical Div. Pedestals for Passenger Car Trucks; 1928. Recommended dimensions and design requirements for 4 sizes, for single, bottom equalizer trucks having rectangular section wheel pieces.

American Railway Assn. Mechanical Div. Sill, Center, Steel, Section for; 1922. Dimensions of 12-inch section for railway car center sill.

American Railway Assn. Mechanical Div. Recommended Practice. Truck Sides, Cast Steel, Gages for; 1917. Dimensions and design of straightening and journal box bolt spacing gage, etc.

American Railway Assn. Mechanical Div. Limiting Dimensions for Cast Steel Truck Side Frames; 1929. Main dimensions and tolerances for 3 sizes.

American Society for Testing Materials. A 113–29; 1929. Structural Steel for Locomotives and Cars. Not including boiler and fire-box plates. Chemical composition, tension, and bend test requirements for structural steel for cars, structural steel for locomotives, plates for cold pressing, and rivet steel, permissible variations in weight and dimensions from quantities specified.

Assn. of American Steel Manufacturers. Structural and Boiler Steel; 1922. Includes class A for railway bridges, ships, cars, etc., chemical composition, tension, and bend test requirements, permissible variations in weight.

U. S. Gov., Federal Specifications Board. 373a; 1929. Steel, Structural, for Cars. Grade A, structural steel, noncopper; grade B, structural steel, copper; grade C, steel for cold pressing, noncopper; grade D, steel for cold pressing, copper; grade E, rivet steel, noncopper; grade F, rivet steel, copper. Chemical composition, tension test, and bend test requirements, permissible variations in weight of plates and shapes, and permissible variations in dimensions of rods and bars from the quantities ordered.

References.—Alloy structural steel for cars. *See* 621.31, 621.32, 621.33. Methods *of* testing, general requirements for metals. *See also* 600.1. Classification of railway materials. *See* 600.2. Zinc and other coatings. *See also* 600.3. Tolerances *on* weight and thickness of plates and bars. *See also* 600.7. Standard thicknesses *of* plates. *See* 604.0. Standard sheet sizes. *See also* 604.10, 604.20. Rivet steel, rivets. *See also* 603.21, 608.4. Boiler and firebox steel. *See* 604.11. Other cast steel railway materials. *See* 611.4. Locomotives and cars. *See* 701.3, 726.

605.14 Structural Steel for Machinery

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steel angles, shapes, and stays for boilers, requirements on tension test and bend test.

American Railway Assn. Signal Section. 2111; 1911. Machinery Steel. General quality, chemical composition, tensile strength, elongation, and bending test requirements.

References.—Alloy structural steel. *See* 621.31, 621.32, 621.33. Methods *of* testing, general requirements for metals. *See also* 600.1. Standard thicknesses *of* plates. *See* 604.0. Boiler and firebox steel. *See* 604.11. Steel castings *for* machinery and boilers. *See also* 611.41.

605.15 Structural Iron and Steel for Ships

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Iron plates and angles. Requirements on tension and cold bend tests.

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steel plates, angles, bulb angles, channels, etc. Tension test and bend test requirements.

American Society for Testing Materials. A 12–21; 1921. Structural Steel for Ships. Chemical composition and tests, tension and bend test requirements, permissible variations in weight and thickness. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 13–24; 1924. Rivet Steel for Ships. For rolled bars, required chemical composition and tests, tension and bend test requirements, permissible variation in diameter; for the rivets, bend and flattening test requirements.

Assn. of American Steel Manufacturers. Structural and Boiler Steel; 1922. Includes class A for railway bridges, ships, cars, etc., chemical composition, tension, and bend test requirements, permissible variations in weight.

U. S. Gov., Federal Specifications Board. QQ–S–751; 1931. Steel, Structural, for Ships Other than Naval Vessels. Structural Steel and Rivet Steel. Chemical composition, tension test, and bend test requirements, permissible variations in dimensions and weight of plates and shapes, permissible variations in dimensions of bars and rods.

References.—Alloy structural steel. *See* 621.31, 621.32, 621.33. Plates *for* ship hulls. *See also* 604.13. Methods of testing, general requirements for metals. *See also* 600.1. Zinc and other coatings and tests. *See also* 600.3. Tolerances *on* weights and thickness *of* plates and bars. *See also* 600.7. Standard thicknesses of sheets and plates. *See* 604.0. Rivet steel, rivets. *See also* 603.21, 608.4. Steel castings for ships. *See also* 611.41. Boats, ships. *See* 725.3, 725.4.

605.19 Miscellaneous Structural Steel

American Electric Railway Engr. Assn. Recommended Specification. W104–28; 1928. Approved by American Standards Assn. as tentative standard E10–1929. Specification for Materials for Use in the Manufacture of Special Trackwork. Includes steel for structural shapes and plates, chemical composition, tensile strength, and bend test requirements.

American Society for Testing Materials. A 78–30; 1930. Steel Plates of Structural Quality for Forge Welding. Chemical composition and tests for two grades of steel, tension and bend test requirements and permissible variations in weight and dimensions.

References.—Alloy structural steel. See 621.31, 621.32, 621.33. Methods *of* testing, general requirements *for* metals. *See also* 600.1. Zinc coatings. *See also* 600.3. Tolerances *on* weights and thicknesses *of* plates and bars. *See also* 600.7. Standard thicknesses *of* sheets and plates. *See* 604.0. Rivet steel, rivets. *See also* 603.21. 608.4. Other steel track materials. *See* 606.

605.2 STRUCTURAL SHAPES AND PLATES, FABRICATED

605.20 General Items

American Electric Railway Engr. Assn. Misc. methods and practices. B207–20; 1920. Rules for inspection and maintenance of bridges.

605.21 Steel Bridges and Railway Turntables

American Assn. of State Highway Officials. American Railway Engineering Assn. 1929 Manual. Steel Highway Bridges; 1929. Materials according to A. S. T. M. specifications, requirements on punching, machine work, assembly, tension test of eye bars, erection, limiting clearances, drainage, loadings and distribution of load for designed use, computation of impact forces, unit stresses proportioning and general design of parts, bracing, girders, etc.

American Railway Engineering Assn. 1929 Manual and 1930 Supplement to Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Materials required for various parts, conditions specified for computation of stresses and machinery power requirements, proportioning of parts and machinery power, friction coefficients, allowable unit stresses, bearing stresses, permissible loads and strength of wire rope, general design requirements for rail end connections, rim girders, counterweights, bearings, shafts, gears, and other bridge parts, design and type requirements for steam power equipment, gasoline engine equipment, electrical power and controllers, specifications for cast steel, forged steel, tool steel, bronzes, babbitt metal, workmanship and erection.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Steel Railway Bridges; 1924. Span limits for beam, girder, and truss bridges, minimum clearances, minimum live loads, computation of impact, lateral force, centrifugal force, longitudinal force, allowable unit stresses and proportioning of parts, slenderness and depth ratios, general design requirements for riveted joints, stay plates, lacing, pins, etc., floors, bracing, plate girders, trusses and viaducts, chemical composition, tension and bend test requirements for structural and rivet steel and for cast steel, permissible variations in thickness and weight of plates and shapes, chemical composition and transverse test requirements for cast iron, workmanship and structural requirements for bridge members, riveting, etc., tension test requirements for full sizes eye bars.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Steel Railway Turntables; 1924. For balanced and 3-point support types, clearances, minimum live loads for design, allowable unit stresses and proportioning of parts, general features of design of center, end trucks, pit and tracks.

American Railway Engineering Assn. Steel Highway Bridges; 1929. See American Assn. of State Highway Officials.

American Society of Civil Engineers. Final Report on Specifications for Design and Construction of Steel Highway Bridge Superstructure; 1924. Construction, loading and application of loads, allowable stresses, details of design, tension and bend test requirements for structural steel, permissible variations in weight and dimensions, test requirements for eye bars. Specifications for structural nickel steel to conform to those of the American Society for Testing Materials.

American Society of Civil Engineers. Final Report on Specifications for Design and Construction of Steel Railway Bridge Superstructure; 1923. Types of loading and other items requiring consideration in the design, allowable stresses in various materials and parts, design requirements, construction, eye bar tests, tension and bend test requirements for the steel, permissible variation in weight and dimensions, data and curves for use in bridge design. The specifications for nickel structural steel conform to those of the American Society for Testing Materials.

References.—Rules for inspection and maintenance of bridges. *See also* 605.20. Methods of testing, general requirements for metals. *See also* 600.1. Structural steel for bridges. *See also* 605.11, 621.31, 621.32, 621.33. Rivet steel, rivets. *See also* 603.21, 608.4.

605.22 Steel Buildings and Metal Parts of Buildings

American Institute of Steel Construction (Inc.). Standard Specification for Fireproofing Structural Steel Buildings; 1927. Test procedure according to A. S. T. M. C 19–26T. Classification of fires and fire hazards, steel variation with temperature, alternate test method to that of A. S. T. M., safety factor.

American Institute of Steel Construction. Structural Steel for Buildings; 1929. Material according to A. S. T. M. specification A9–24, loading, allowable stresses, proportions of girders and beams, requirements as to rivet and bolt proportions and spacing, design of connections and lattice, painting, punching, erection.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Railway Buildings, Sec. 12–B. Ornamental and Misc. Metal Work. Metal clad doors, metal covered sash. Requirements on number of plies, general quality, and species of wood in core, weight of terne plate in cover, watertightness, to meet requirements of Nat. Board of Fire Underwriters.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Sheet Metal Work; 1927. Made of copper, galvanized iron, lead or rolled zinc, thickness of soft copper for flashings and of hard copper for eaves troughs, gutters, rain conductors, and cornices, thickness of galvanized iron, lead, and zinc, solder according to A. S. T. M. specifications, construction and installations for flashings, gutters, cornices, rain conductors, hip capping, skylights.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Purposes; 1929. General construction requirements for excavation, filling, sewers, and drainage, concrete and masonry work of various types, roofs, sheet-metal work, structural steel and iron, millwork, painting, plastering, hardware, plumbing, heating, electrical work, floor and pavements, etc.

Associated Factory Mutual Fire Insurance Companies. Tin Clad Fire Doors and Shutters; 1925. Two types of fire doors, their application, requirements for sills, door openings and heads, construction of wooden core, covering material and method of covering, hardware, similar requirements for shutters.

National Assn. of Sheet Metal Contractors. Standard Practice in Sheet Metal Work; 1929. A compilation of drawings with descriptive items of standard construction and typical designs for sheet metal structural items covering roofing, gutters, conductors, flashings, corrugated iron work, skylights, ventilators, metal cornices, metal ceilings, warm air furnaces, heating and ventilating systems, blow pipe and exhaust systems, fire doors, hollow metal doors and trim, hollow metal windows, restaurant, kitchen and hotel equipment, protective coatings and paints, a total of 356 drawings.

National Assn. Sheet Metal Contractors. Standard Practice in Sheet Metal Work; 1929. Section VIII. Fire Doors, Tin Clad, All Metal and Metal Covered. Includes regulations of National Board of Fire Underwriters for the protection of openings in walls and partitions against fire, for 1927, typical illustrated designs of fire doors for many applications showing fixtures, fusible link connections, for types that meet requirements of Fire Underwriters and types that do not.

National Assn. Sheet Metal Contractors. Standard Practice in Sheet Metal Work; 1929. Sections IX and X. Hollow Metal Door and Trim, Hollow Metal Window. Requirements for hollow metal door and trim, including construction, gage of sheet metal, and finish, typical designs illustrated of swing doors, elevator doors, entrance doors, jamb sections, double hung windows, mullioned, daylight and casement windows.

National Board of Fire Underwriters. Recommended Building Code; 1931. Code for adoption by cities for controlling building construction as regards fire hazard. Covers classification of buildings, permissible area of lot occupied, requirements on excavations, foundations, walls, heights and areas, allowable loads, means of egress, tests and quality of materials, working stresses, cast iron, steel, and timber construction, roofs, fire doors and windows, cellars, vaults, mill construction, fireproof construction, reinforced concrete construction, fire tests, installation of heating apparatus, standpipe and sprinkler requirements, theater and assembly hall construction, plumbing and electrical requirements, construction of elevators, tenement house laws.

National Electrical Mfrs. Assn. Publ. No. 31–10. 1931. Switchgear Standards. SG8–60. Outdoor Substations. Structural steel according to spec. A9 of Am. Soc. for Testing Materials, requirements on strength of bolt and rivet steel, minimum thickness of metal in structure, minimum sizes of bolts and rivets, zinc coating of steel work, allowances for ice and wind loads, permissible stresses, general design of foundations, spacing of rivets and bolts, fabrication, current ratings for bare conductors.

National Fire Protection Assn. Building Construction, Standard Industrial Buildings; 1929. For buildings over 1 story, includes protected Steel Construction, permissible height and floor area, number of exits, materials and stresses according to quoted specifications, requirements on construction and protection of roof and wall openings and shaft enclosures, on wall thicknesses, on fireproofing of structural members, floors and roofs, electrical and fire equipment, etc.

Railway Fire Protection Assn. Handbook; 1925. Garages and Repair Shops. (For Rail Motor Cars.) Recommendations that construction be in conformity with National Building Code, of fire resistive materials, without unventilated cellars, recommendations on drainage of floors, on lighting, heating, natural or mechanical ventilation, on separation from garage of repair shop and battery charging plant, on exhaust discharge of gasoline motors in shops, on storage and handling of gasoline and oil, and on fire protection facilities to be provided.

Underwriters' Laboratories. Tin-Clad Fire Doors and Shutters; 1930. Acceptable woods, minimum dimensions and finish of core, weight of terneplate covering, size and type of nails, assembly, nailing and finished dimensions of cores of 2 and 3 ply, forming, application and mailing of face plates, provision of vent hole and astragal, construction where glass panels are used, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R72–30; 1930. Solid Section Steel Windows. Simplified practice recommended and accepted by industry establishing a standard nomenclature, standard symbol designations, and a limited list of stock, standard, and listed special sizes and types for basement windows, pivoted windows, Underwriters' labeled windows, projected windows, and industrial doors.

Steel Joist Institute. Steel Joist Construction; 1932. Includes construction specifications for steel joists composed of rolled shapes, riveted or welded bars or rods, or expanded rolled shapes, as used between girders. Steel according to A. S. T. M. spec. A9, requirements on methods of design and stresses, span, spacing, bridging, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R82–28; 1928. Hollow Metal Single Acting Swing Doors, Frames and Trim. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes of hollow metal doors, including door clearances, door dimensions, details of butt mortise, lock mortise, and strike mortise, dimensions of transom. rough buck, cabinet jamb, casing, and combination frame, types of combination frame.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R83–28; 1928. Kalamein Single Acting Swing Doors, Frames, and Trim. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes and dimensions for kalamein doors, including types of doors, door clearances, door dimensions, jamb details, gauge of metal and butt mortise details.

References.—Structural steel for buildings. *See also* 605.12, 621.31, 621.32, 621.33. Sheet metal roofing. *See also* 604.3. Sheet metal eaves troughs. *See also* 607.5. Rivet steel, rivets. *See also* 603.21, 608.4. Masonry and frame buildings, parts of buildings, fire tests of materials. *See* 518.50, 518.51.

605.23 Steel Tanks, Towers, and Flumes

American Petroleum Institute. Standard No. 4; 1931. Standard Rigs and Derricks. Requirements on standard major dimensions of steel, and of wood derricks, including heights, bases and water table openings, grade of steel for steel derricks (A. S. T. M. spec. A94), requirements on wind and dead load capacities.

American Petroleum Institute. Standard No. 12–A and Supplement No. 2; 1931. Standard Tanks with Riveted Shells. For oil storage tanks, requirements on tank sizes, grade of steel, maximum stresses and design specifications for shell, roof, and bottom, fabrication and erection, number and thicknesses of plates for various tank capacities.

American Petroleum Institute. Standard No. 12–B; 1931. Standard Bolted Tanks. For oil storage tanks, requirements on spacing of bolts, pitch of cone roof, dimensions of tank and shell, thickness of plate and size of bolts for various tank parts, for various standard capacities.

American Railway Assn. Electrical Section. VI–a–23; 1923. Electric Light, Power Supply and Trolley Lines Crossing Railways. Steel Structures. For steel supporting towers at crossings, requirements on general construction, minimum thickness of metal, minimum sizes of angles, bolts, and rivets, minimum spacing of rivets, maximum unsupported length of compression members, ratio of tower length to radius of gyration, allowable unit stresses in tension and compression for structural shapes, steel to conform to Am. Soc. for Testing Materials spec. A–9 for structural steel for buildings.

American Railway Assn. Electrical Section. VI–b–25; 1925. Construction of Overhead Electric Supply Lines for Railroad Use on Railroad Property. Steel Structures. Requirements on general construction, minimum thicknesses of metal, minimum sizes of angles, bolts, and rivets, spacing of rivets, permissible unsupported length of compression members, ratio of length to radius of gyration, allowable unit stresses for structural shapes, bolts, and rivets, steel in accordance with A. S. T. M. spec. A–9 for structural steel for buildings. Includes steel towers and steel poles.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Steel Substructures for Water Tank; 1921. 12 post tower for supporting 50,000 and 100,000 gallon wooden water tanks, dimensional drawings of standard designs, material, and workmanship according to A. R. E. A. specifications for Iron and Steel Structures.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Steel Water and Oil Tanks; 1912. For tanks requiring plates not more than ⅝ inch thick, steel the same as for steel railway bridges, allowable unit stresses, forming and punching of plates, making of joints, minimum thickness of plates and size of rivets, painting.

American Society of Mechanical Engineers. Boiler Construction Code; 1931. Section VIII. Unfired Pressure Vessels. Specifications of safety valves, allowable design stresses in materials, construction and allowable working pressures of vessel, riveted joints, dished heads, braced and stayed surfaces and openings, vessel supports, hydrostatic pressure test, rules for the fusion process of welding, rules for forge welding, rules for brazing, requirements for enameled pressure vessels.

Associated Factory Mutual Fire Insurance Companies. Fuel Oil Installations for Furnaces and Engines; 1928. Includes specifications for steel or iron storage tanks, materials, joints, connections and rust proofing requirements, installation and piping connections, requirements as regards tank heating, for underground, above ground and inside tanks, with special reference to fire hazards.

Associated Factory Mutual Fire Insurance Companies. Gravity Water Tanks and Steel Towers. Vol I. Structural Details; 1931. For steel towers for supporting water tanks, minimum number of columns, materials according to A. S. T. M. specifications, computation of dead, live, and wind load, allowable unit stresses, design details.

Associated Factory Mutual Fire Insurance Companies. Gravity Water Tanks and Steel Towers. Vol. I. Structural Details; 1931. For steel tanks for fire protection, standard sizes; plates, shapes and rivets according to A. S. T. M. specifications; dead, live, and wind load computations, allowable stresses, thicknesses of plates and design details.

Associated Factory Mutual Fire Insurance Companies. Gravity Water Tanks and Steel Towers. Vol. II; 1929. Piping, Fittings, and Heating Systems. For water tanks, requirements for discharge pipe and fittings, expansion joint, overflow, clean out and drain, mill-use connections, tell-tale, valve pit or valve house, frost proof casings for pipes. General requirements for steam heaters and for coal burning heaters, recommended designs and makes of heaters.

Associated Factory Mutual Fire Insurance Companies. Storage and Handling of Flammable Liquids; 1931. Storage Tanks. Requirements on minimum gage of steel or wrought iron for various capacities of underground tanks, construction of joints, internal pressure test, construction of connections, installation rules, rust proofing.

National Board of Fire Underwriters. Containers for Storing and Handling Flammable Liquids; 1927. Includes underground storage systems without inside discharge, inside discharge systems, portable tanks in buildings, general storage, concrete tanks, storage cabinets, outside storage houses for 3 classes of liquids depending on flash point, capacity and location of tanks, setting, thickness of sheet steel, venting, filling and withdrawal of liquid requirements, fittings, piping.

National Board of Fire Underwriters. Oil Burning Equipments, Storage and Use of Oil Fuels; 1928. Construction of galvanized steel or iron tanks, for underground and for above ground storage, thickness of metal, rust proofing, setting of tanks, location and capacity of tanks, piping and protection of piping, installation of valves, heating equipment, pumps for oil, ventilation, fire equipment.

National Board of Fire Underwriters. Tanks, Gravity and Pressure, Towers; 1931. Pressure Tanks, used for automatic sprinkler systems, air pressure, water level, and air lock requirements, construction according to specifications for unfired pressure vessels of American Society of Mechanical Engineers, design of supports, requirements on pipe connections, fittings, gauges, safety appliances.

National Board of Fire Underwriters. Tanks, Gravity and Pressure. Towers; 1931. Steel Gravity Water Tanks. Standard sizes, form, steel according to A. S. T. M. specifications, design requirements, minimum thicknesses, construction requirements and accessories, design and construction requirements for concrete foundations and supports on buildings, required pipe connections, minimum sizes, location of valves, valve enclosures and frost protection, construction requirements for steam heating and coal-burning heater installations.

National Board of Fire Underwriters. Tanks, Gravity and Pressure, Towers; 1931. Steel Towers. Towers for supporting water tanks, minimum number of columns, steel according to A. S. T. M. specifications, design requirements, maximum unit stresses, minimum thickness of metal, size of rivets, construction requirements, accessories, design and construction of concrete foundations, design of supports on buildings.

National Fire Protection Assn. Suggested Ordinance Regulating Use, Handling, Storage, and Sale of Flammable Liquids; 1926. Includes specifications for steel or iron tanks, above ground and underground type, requirements on thickness of metal, on pressure test for pressure tanks, on strength of steel, general construction of tanks and foundations, venting, location of valves, piping requirements, etc.

Underwriters' Laboratories. Horizontal and Vertical Above-Ground Storage Tanks for Hazardous Liquids; 1922. For steel plate construction, limiting capacities and dimensions, minimum thicknesses of plates, acceptable methods of making pipe connection, seam and head joints, types and construction of heads for horizontal tanks and of top and bottom of vertical tanks, manhole requirements and construction, pressure test requirements.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Steel Tanks for Storage of Fuel Oils. For use on passenger vessels, mandatory requirements on riveting of joints, minimum thickness of plates, hydrostatic test, size of vent pipe, attachment of fittings, installation of heaters.

References.—Structural steel for bridges and buildings. *See also* 605.11, 605.12. Alloy structural steel. *See also* 621.31, 621.32, 621.33. Plates for tanks. *See also* 604.1. Zinc coatings and tests. *See also* 600.3. Other tanks. *See* 956.2. Range boilers, expansion tanks, fuel tanks. *See also* 614.1, 614.3. Railway tank cars. *See* 726.1.

605.24 Metal Lath

Contracting Plasterers' International Assn. Outline Specification for Lathing and Plastering; Feb. 1931 issue of Plastering Craft. Wire Lath and Metal Lath. Requirements on size of wire, mesh, painting, and weight of wire lath, gauge thickness, painting, and weight of metal lath.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R3–28; 1928. Metal Lath. Simplified practice recommended and accepted by industry establishing a limited list of stock sizes and varieties of flat expanded and of rib expanded metal lath, weights per square yard and gauge of metal, minimum weight of painted steel sheet lath.

U. S. Gov., Federal Specifications Board. QQ–B–101; 1930. Metal Bases for Plaster and Stucco Construction. For expanded metal base, flat expanded metal lath, flat rib lath, self-furring lath, ⅜-inch and ¾-inch rib lath, expanded metal reinforcement, sheet-metal base, flat sheet-metal lath, ribbed sheet metal lath, wire base, woven wire lath, ribbed woven wire lath, woven wire fabric, and welded wire fabric, definitions of types, gages and weights of metal for various weight grades of above types, structural features, requirements on strength of wire and fabric, and strength and quality of backing paper.

References.—Standard thicknesses of sheets. *See* 604.0. Tolerances on weights and thickness of sheets. *See also* 600.7. Building construction. *See* 518.50, 518.51. Wire sizes. *See* 603.40.

605.25 Steel for Concrete Reinforcement

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Reinforcement. Specifications for bar reinforcement the same as A 15–30 of Am. Soc. for Testing Materials except for disallowance of cold twisted bars, all bars of open hearth structural steel, test specimens not less than 24 inches long.

American Assn. of State Highway Officials. Tentative Specifications; M–31. 1924. Billet Steel Concrete Reinforcement Bars. For plain or deformed bars, requirements on percentage phosphorus, tension test, and bend test requirements, variation in weight from theoretical, sampling and testing in accordance with A. A. S. H. O. methods. Not applicable to bars for bridges and incidental structures.

American Assn. of State Highway Officials. Tentative Specifications; M–32. 1924. Cold Drawn Steel Wire Fabric For Concrete Reinforcement.

Up to ½ inch in diameter, tension and bend test requirements, permissible variations in diameter from size ordered.

American Railway Engineering Assn. 1929 Manual. Masonry. Billet-Steel Concrete Reinforcement Bars; 1920. Plain and deformed bars of 3 grades of hardness, made from new billets, chemical composition, tension and bend test requirements, permissible variation in weight.

American Society for Testing Materials. A 15–30; 1930. Billet-Steel Concrete Reinforcement Bars. Covers plain, deformed, and cold twisted bars, plain and deformed in 3 grades, and structural steel, intermediate and hard. Requirements on chemical composition and tests, tension and bend tests, permissible variation in weight. 1914 edition is available in Spanish and French from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 16–14; 1914. Rail-Steel Concrete Reinforcement Bars. For plain, deformed and hot twisted bars. Tension and bend test requirements, permissible variation in weight. Available in Spanish and French from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 82–27; 1927. Cold Drawn Steel Wire for Concrete Reinforcement. For wire of gages 0.080 to 0.525 inch, tension and bend test requirements, permissible variations in gage.

Assn. of American Steel Manufacturers. Concrete Reinforcement Bars Rolled from Billets; 1928. Chemical composition requirements, tension and bend test requirements for 3 grades of plain and deformed bars and 1 grade of cold twisted bar, permissible variations in weight.

Assn. of American Steel Manufacturers. Rail Steel Concrete Reinforcement Bars; 1914. Tension and bend test requirements for plain reinforcement bars and for deformed and hot-twisted bars, number of twists for hot-twisted bars.

Concrete Reinforcing Steel Institute. Standards for Concrete Reinforcing Bars. 1930. Table of standard sizes, areas, and weights per foot for reinforcing bars, sizes and areas as adopted by industry in simplified practice recommendation R26–30 of U. S. Bureau of Standards.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R26–30; 1930. Steel Reinforcing Bars. Simplified practice recommended and accepted by industry establishing a limited list of standard areas of reinforcing bars and the equivalent sizes of round and square bars. A. S. A. No. A47–1932.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R53; 1926. Steel Spiral Rods for Concrete Reinforcement. Simplified practice recommended and accepted by industry establishing a limited list of standard round rod sizes for spiral reinforcement and standard pitches of spiral for various column core sizes and percentages of reinforcement area to concrete area. Approved by American Standards Assn. as A38–1927.

U. S. Gov., Federal Specifications Board. 350a; 1929. Bars, Reinforcement, Concrete. 4 types, A, plain; B, deformed; C, hot twisted; D, cold twisted; 4 grades, 1, structural-billet steel; 2, intermediate-billet steel; 3, hard-billet steel; 4, hard-rail steel; 3 classes, a, open hearth steel-basic; b, open hearth steel-acid; c, bessemer steel. Chemical composition, tensile test, and bend test requirements, permissible variations from theoretical weights.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals. *See* 600.2. Concrete building construction. *See* 518.50, 518.51. Concrete bridge construction. *See* 518.4.

605.26 Iron and Steel Castings and Forgings

References.—Iron castings. *See* 611.1. 611.2. Steel castings. *See* 611.4. Iron forgings, steel forgings. *See* 611.3, 611.5.

606. RAILWAY TRACK MATERIAL

606.0 GENERAL ITEMS

American Electric Railway Engr. Assn. W2–15; 1915. Standard Third-Rail Terminology. Definition of bond and third-rail gage.

American Electric Railway Engr. Assn. W10–21; 1921. Standard Designs and Engineering Data for Turnouts and Crossovers for Tongue Switch Construction. Drawings and tabulated data.

American Electric Railway Engr. Assn. W12–23; 1923. Standard Method for Designating Compromise Joints.

American Electric Railway Engr. Assn. W13–28; 1928. Standard System of Uniform Track Spirals and Simplified System of Single Branch-off Frogs. Drawings and tabulated data on Searles type track spirals and switch easements, drawings of 7 standard single branch-off frogs for 4 feet 8½ inch gage, drawings showing single track branchoffs for wider gages and the application of standard frogs to these branchoffs.

American Electric Railway Engr. Assn. W14–22; 1922. Standard Diagram Showing Proper Location of Tongue Switches.

American Electric Railway Engr. Assn. W35–28; 1928. Standard Recommended Distances Between Tangent Track Centers Through Special Trackwork Layouts for All Track Gages.

American Electric Railway Engr. Assn. W40–28; 1928. Rules for Determination of Flangeways and Gages on Curves. For single or double truck cars with four wheel trucks. Rules for determining and applying minimum flangeways and gages for guarded curves with and without frogs, graphs showing guard distances and flangeways for 33-inch wheels.

American Electric Railway Engr. Assn. W45–29; 1929. Protection of Contact Rail Where Protected Third Rail is Used. Standard design of protection for over-running and under-running types of contact rail.

American Electric Railway Engr. Assn. Recommended Design. W111–25; 1925. Car Clearance Easements With Standardized Frogs for Various Gages. Typical curves and tabulated data on seven car clearance easement curves for each of 5 track gages requiring but 8 standard frogs, data for which are included.

American Electric Railway Engr. Assn. Recommended Specification. W113–28; 1928. Prepared jointly with Am. Soc. of Municipal Engineers. Street Railway Track Construction. For track in paved city streets, recommendations on excavation and subgrade, subsoil and surface drainage, plain ballast and concrete slab subballast construction, types of rails, rail joints, rail bonds, ties, pavement.

American Mining Congress under auspices of American Standards Assn. M 7a–1927. Mine Tracks and Signals (coal mines). Standard track gage, drillings for splice bars, frog numbers and angles, dimensioned drawings of standard riveted frogs, cast frogs, switches, and switch accessories.

American Railway Assn. Mechanical Div. Wheels and Track, Terms and Gaging Points for; 1894. Definitions and standard dimensions for gage of track, inside gage of wheel flanges, gage of wheels, thickness of flange, width of tread, check gage distance, and over all gage.

References.—Wood Ties. *See* 401. Rock and Stone Ballast. *See* 511.73. Track bonds and bonding. *See* 718.49. Track tools. *See* 616.8.

606.1 STEEL RAILS, TEE, AND GIRDER

American Electric Railway Engr. Assn. W1–27; 1927. Manufacture of Open-Hearth Steel Girder Rails of Plain, Grooved, and Guard Types. Classification of girder guard rails and of plain and grooved girder rails into 3 classes as regards quality of material, requirements on chemical composition of each class, impression test, permissible variations from templet dimensions, tolerances on punching and milling.

American Electric Railway Engr. Assn. W6–30; 1930. Approved by American Standards Assn. as E4–1923. Standard Design for 7-Inch Girder Grooved Rail. Detail dimensions of section of standard 7-inch, 122-pound rail.

American Electric Railway Engr. Assn. W7–30; 1930. Standard Design for 9-Inch Girder Grooved Rail. Detail dimensions of section of standard 9-inch, 134-pound rail.

American Electric Railway Engr. Assn. W8–30; 1930. Standard Design for 7-Inch Girder Guard Rail. Detail dimensions of standard section of rail.

American Electric Railway Engr. Assn. W9–30; 1930. Standard Design for 9-Inch Girder Guard Rail. Detail dimensions of standard section of rail.

American Electric Railway Engr. Assn. W16–29; 1929. Carbon Steel Rails of Standard Section. Requirements on chemical analysis for 5 weight grades up to 140-pound size, drop test, fracture test, standard lengths, finish, tolerances on location and sizes of bolt holes. Identical in many respects with A. S. T. M. spec. A1–27.

American Electric Railway Engr. Assn. W28–28; 1928. Standard Design for Light Seven Inch Girder Grooved Rail. Detail dimensions of standard section for 7-inch, 103-pound rail.

American Electric Railway Engr. Assn. W31–30; 1930. Design of Plain Girder Rails and Splice Bars. Standard section design and dimensions for 7-inch 82-pound, 7-inch 92-pound, and 7-inch 102-pound plain girder rails for use in paved streets, section data, drilling for splice bars.

American Railway Engineering Assn. 1929 Manual. Drop Test Machine; 1910. For testing railroad rails by dropping a weight on transversely supported rail, minimum height of fall and range of adjustment of span supports, construction requirements for anvil and supporting springs, base plate, substructure, pedestals, leads, design and weight of tup.

American Railway Engineering Assn. 1929 Manual and 1930 Supplement to Manual. Open Hearth Carbon Steel Rails; 1925. Chemical composition and drop test requirements, classification into 3 classes dependent on quality and defects, standard lengths, permissible variations in dimensions and weight.

American Railway Engineering Assn. 1929 Manual. Open-Hearth Steel Girder Rails of Plain, Grooved and Guard Types; 1929. Chemical composition and hardness test requirements, permissible variations in dimensions and weight, drilling and finish requirements, classification according to quality.

American Railway Engineering Assn. 1929 Manual. Relayer Rail for Various Uses; 1920. Classification according to wear, grades according to defects and length.

American Railway Engineering Assn. 1929 Manual. Standard Rail Sections; 1924. Dimensioned drawings with section data for 90, 100, 110, 120, 130, 140, and 150 pound rails, and for 128, 149, 159, and 174 pound girder and girder guard rails.

American Society for Testing Materials. A 1–30; 1930. Open-Hearth Carbon Steel Rails. Chemical composition for rails of various weights, drop test requirements, standard length and weight, quality classification. 1924 edition available in Spanish and Portuguese from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 2–27; 1927. Manufacture of Open-Hearth Steel Girder Rails of Plain, Grooved and Guard Types. Chemical composition and impression test requirements for three classes of rails, standard dimensions and permissible variations. Agree with those specs of A. E. R. E. A. and A. E. R. A. 1924 edition available in Spanish and 1927 issue available in Portuguese from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

References.—Alloy steel rails. *See* 622.2. Methods of testing, general requirements for metals. *See also* 600.1. Classification of railway materials. *See* 600.2. Track construction. *See* 606.0.

606.2 RAIL JOINT PLATES AND TIE PLATES

American Electric Railway Engr. Assn. W4–22; 1922. American Standards Assn. E 2–1923. Standard Design for Joint Plates for 7-inch Girder Groved and Girder Guard Rails. Standard design and dimensions.

American Electric Railway Engr. Assn. W5–22; 1922. American Standards Assn. E 3–1923. Standard Design for Joint Plates for 9-inch Girder Groved and Girder Guard Rails. Standard design and dimensions.

American Electric Railway Engr. Assn. W17–22; 1922. Standard Specification for Low Carbon-Steel Splice Bars. Limits on phosphorus content, tension and bend tests. Identical in substance with A. S. T. M. specification A3–14.

American Electric Railway Engr. Assn. W18–22; 1922. Standard Specification for Medium Carbon-Steel Splice Bars. Chemical analysis and tests, tension and bend tests. Identical in substance with A. S. T. M. specification A4–14.

American Electric Railway Engr. Assn. W19–22; 1922. Standard Specification for High Carbon-Steel Splice Bars. Chemical analysis and tests, tension and bend tests. Identical in substance with A. S. T. M. specification A5–24.

American Electric Railway Engr. Assn. W20–22; 1922. Standard Specification for Extra High Carbon-Steel Splice Bars. Chemical analysis and tests. Identical in substance with A. S. T. M. specification A6–14.

American Electric Railway Engr. Assn. W23–23; 1923. Standard Specification for Steel Tie Plates. Chemical composition and tests, bend test, permissible variation in dimensions, for soft and medium grade steel plates. Identical in substance with A. S. T. M. specification A67–20T.

American Electric Railway Engr. Assn. W31–30; 1930. Design of Plain Girder Rails and Splice Bars. Includes splice bars for 7-inch rails of 82, 92, and 102 pounds weight, standard dimensions, weight, and drilling of splice bars, size and weight of bolts.

American Railway Engineering Assn. 1929 Manual. High Carbon Steel Joint Bars; 1915. Maximum phosphorus content, tensile and bend test requirements, temperature of shaping and punching, punching and finish requirements.

American Railway Engineering Assn. 1929 Manual. Malleable Iron Tie Plates; 1920. Tension test requirements, permissible variations from drawing dimensions.

American Railway Engineering Assn. 1929 Manual. Quenched Carbon Steel Joint Bars; 1924. Chemical composition, tensile, and bend test requirements, permissible variation in dimensions, temperature during punching and shaping.

American Railway Engineering Assn. 1929 Manual. Steel Tie Plates; 1926. Soft and medium grades, chemical composition and bend test requirements, permissible variations in specified dimensions.

American Railway Engineering Assn. 1929 Manual. Wrought Iron Tie Plates; 1920. Tension and bend test requirements, permissible variations from drawing dimensions.

American Society for Testing Materials. A 3–24; 1924. Low Carbon Steel Splice Bars. Chemical composition and tests, tension and bend test requirements. Available in Spanish and Portuguese from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 4–14; 1914. Medium Carbon Steel Splice Bars. Chemical composition and tests, tension and bend test requirements. Available in Spanish and French from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 5–14; 1914. High Carbon Steel Splice Bars. Chemical composition and tests, tension and bend test requirements. Available in Spanish and French from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 6–14; 1914. Extra High Carbon Steel Splice Bars. Chemical composition and tests, tension and bend test requirements. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 49–21; 1921. Quenched High Carbon Steel Splice Bars. Chemical composition and tests, tension and bend test requirements. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 67–30; 1930. Steel Tie Plates. For soft and medium grades, chemical composition test requirements for bassemer and open-hearth steel, bend test requirements, permissible variations in dimensions.

Association of American Steel Manufacturers. Steel Tie Plates; 1923. For soft, medium and hard grades, hot or cold punching and shearing requirements, chemical composition requirements.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Classification of railway materials. *See* 600.2. Track construction. *See* 606.0.

606.3 SWITCHES AND SPECIAL TRACK WORK

American Electric Railway Engr. Assn. W11–30; 1930. Standard Dimensions of Switches and Mates. Drawing with tabulated dimensions for standard radii of mates and tongue switches.

American Electric Railway Engr. Assn. W15–22; 1922. Standard Dimensions of Frogs for Crossovers and Turnouts. Dimensioned drawings for frogs for girder grooved, girder guard, plain girder, and standard section rails.

American Electric Railway Engr. Assn. W32–30; 1930. Solid Manganese Steel Special Trackwork for Girder Rail. Permissible variation in flangeways, specifications for flange bearing, wheel clearance, tongue switches and mates, joints, paving face, with other requirements according to W104–16.

American Electric Railway Engr. Assn. W33–30; 1930. Plain Bolted Special Trackwork. Requirements for flangeways, flange bearing practice, tongue switches and mates, guards for frogs and curves, structural details for split switches, frogs, and accessories, materials in accordance with spec. W104–28 of A. E. R. E. A.

American Electric Railway Engr. Assn. W34–30; 1930. Rail-bound Insert Type Special Trackwork. For trackwork with manganese steel inserts at points of greatest wear, requirements on flangeways, flange bearing, wheel clearance, guards for frogs and curves, joints, paving face, tongue switches, mates, frogs, crossings, materials in accordance with spec. W104–28 of A. E. R. E. A.

American Electric Railway Engr. Assn. W39–28 and W43–28; 1928. Design of Bolted Rail Crossings; Steam Railroad over Electric Railway. W39 for angles of 90° to 50° inclusive, W43 for angles from 50° to 30°, standard construction illustrated with some dimensions.

American Electric Railway Engr. Assn. Recommended Specification. W104–28; 1928. Approved as tentative standard by American Standards Assn. E10–1929. Specification for Materials for Use in the Manufacture of Special Trackwork. Materials specified by reference to standard specifications with some modifications and some specified chemical and physical properties for carbon and manganese steel rails, steel, gray iron and malleable castings, forgings, bars, wrought iron, helical springs, splice bars, bolts, nuts, and washers.

American Electric Railway Engr. Assn. Recommended Specification W106–27; 1927. Specification for Cast Steel Construction, Hard Center Special Trackwork. Dimensions and design for flangeway, flange bearing, wheel clearance, tongue switches and mates, cast steel bodies, frogs and crossings, joints, paving face, with materials, chemical and physical properties in accordance with W104–16.

American Electric Railway Engr. Assn. Recommended Specification W107–29; 1929. Iron Bound Hard-Center Special Trackwork. Some dimensions and construction requirements for flangeway, flange bearing, wheel clearance, tongue switches and mates, body castings, frogs and crossings, joints, paving face, materials according to spec. 104–28 of A. E. R. E. A.

American Electric Railway Engr. Assn. Recommended Design W122–27; 1927. Minimum Dimensions for Center Plates for Single and Middle Frogs. Dimensioned drawings.

American Mining Congress. Approved by American Standards Assn. as M 7a–1927. Mine Tracks and Signals. (Coal mines.) Standard track gage, drillings for splice bars, frog numbers and angles, dimensioned drawings of standard riveted frogs, cast frogs, switches, and switch accessories.

American Railway Engineering Assn. 1929 Manual. Frog Filler Sections; 1926. Chemical composition, steel according to A. S. T. M. specifications for commercial bar, permissible variations from drawing dimensions.

American Railway Engineering Assn. and Manganese Track Society. A. R. E. A. Trackwork Plans; 1930. Plans showing standard designs, constructions, and dimensions, with appendix giving requirements on materials and bolts, for switches, switch stands, frogs including manganese steel frogs, guard rails, crossings including bolted rail and solid manganese crossings, turnouts and crossovers, and track construction for paved streets.

References.—Manganese steel track work. *See also* 622.5, 622.9. Methods of testing, general requirements for metals. *See also* 600.1. Classification of railway materials. *See* 600.2. Heat treatments. *See also* 600.5 Track construction. *See* 606.0.

606.4 TRACK BOLTS, NUTS, AND WASHERS

American Electric Railway Engr. Assn. W21–23; 1923. Standard Specification for Quenched, Carbon-Steel Track Bolts. Chemical analysis and tests, tension and bend tests, permissible variation in dimensions. Identical in substance with A. S. T. M. specification A50–21.

American Electric Railway Engr. Assn. W36–28; 1928. Low Carbon Steel Track Bolts. Requirements on chemical composition, tension and bend tests, tolerances on dimensions. Identical in substance with A. S. T. M. spec. A76–27.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Design for Track Bolts. Design and dimensions of track bolts and nuts, same as B 18d–1930 of American Standards Assn. and listed under Am. Soc. of Mech. Engrs. below.

American Railway Engineering Assn. 1929 Manual. Quenched Carbon Steel and Alloy Steel Track Bolts; 1924. Chemical composition, tensile test, and bend test requirements for the bolt, strip test for bolt and nut, permissible variations from drawing dimensions, standard design.

American Railway Engineering Assn. and Manganese Track Society. A. R. E. A. Trackwork Plans, Appendix B; 1930. Bolts. For bolts used in trackwork, requirements on tensile strength and elongation for mild carbon steel bolts, requirements on tensile strength, yield point, elongation, and reduction in area for heat treated or high tensile bolts of carbon or alloy steel, bend test for full size bolts.

American Society of Mechanical Engineers. Joint sponsor with Society of Automotive Engineers. Approved by American Standards Assn. as B 18d–1930. Track Bolts and Nuts Dimensions, thread length, and number of threads for oval neck and elliptic neck track bolts and for square and hexagonal nuts, tables of special sizes for use during transition from present usage to standard sizes.

American Society for Testing Materials. A 50–24; 1924. Quenched Carbon Steel Track Bolts. Heat treatment, chemical composition and requirements, tension and bend test requirements, permissible variation in dimensions. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 76–27; 1927. Low Carbon Steel Track Bolts. Chemical composition and tests, tension and bend test requirements, permissible variations in dimensions.

References.—Alloy steel track bolts. *See* 622.1. Methods of testing, general requirements for metals. *See also* 600.1. Classification of railway materials. *See* 600.2. Heat treatments. *See also* 600.5. Track construction. *See* 606.0.

606.5 TRACK SPIKES

American Electric Railway Engr. Assn. W24–23; 1923. Standard Specification for Steel Screw Spikes. Heat treatment, tension and bend tests, permissible variation in dimensions. Identical in substance with A. S. T. M. specification A66–21.

American Electric Railway Engr. Assn. W25–30; 1930. Standard Specification for Steel Track Spikes. Tension and bend tests, permissible variation in dimensions. Identical in substance with A. S. T. M. specification A65–18.

American Electric Railway Engr. Assn. W41–30; 1930. Design for 5½-inch by $\frac{9}{16}$-inch Track Spike. Design and dimensions of standard spike.

American Railway Engineering Assn. 1929 Manual. Soft Steel Cut Track Spikes; 1926. Chemical composition and bend test requirements, permissible variations in specified dimensions, dimensioned design of 2 sizes.

American Railway Engineering Assn. 1929 Manual. Steel Screw Track Spikes; 1920. Minimum temperature during forming, tension and bend test requirements, permissible variations from specified dimensions, dimensioned design for one size, testing gage design.

American Society for Testing Materials. Tentative Specifications. A 65–26T; 1926. Soft Steel Track Spikes. For bessemer or open hearth steel, requirements on chemical composition, bend tests, and permissible variations from specified dimensions.

American Society for Testing Materials. A 65–24; 1924. Steel Track Spikes. For bessemer or open-hearth steel, requirements on tensile test and elongation of spike or full sized bar stock, permissible variations from specified dimensions.

American Society for Testing Materials. A 66–21; 1921. Steel Screw Spikes. Rolling temperature, tension and bend test requirements.

U. S. Gov., Federal Specifications Board. 534; 1927. Nails, Spikes, Tacks, and Staples. Track Spikes. For iron, steel, copper, zinc, brass, Muntz metal, or copper bearing steel spikes, chemical composition and ductility requirements for materials, dimensions, tolerances and weights of various sizes.

References.—Methods of testing, general requirements for metals. *See* 600.1. Heat treatments. *See also* 600.5. Track construction. *See* 606.0.

606.6 TRACK TIE RODS

American Electric Railway Engr. Assn. W42–29; 1929. Design and Manufacture of Tie Rods. Material according to A. S. T. M. spec. A107–27 for commercial quality bar steel, requirements on tension and bend tests, dimensions and design for flat type and for round type rods, tolerances on dimensions.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Commercial quality bar steel. *See* 603.23.

607. TUBULAR PRODUCTS AND FITTINGS, COCKS, AND VALVES

607.0 GENERAL ITEMS

American Gas Assn. and Nat. Bureau of Standards, sponsors under auspices of American Standards Assn. A. S. A. serial K 2–1927. Gas Safety Code. For Installations and Work in Buildings. Definitions, rules for gas fitting and for installation of gas appliances with notes amplifying the rules.

American Gas Assn. Requirements for House Piping and Appliance Installation; 1928. Fundamental requirements stated that will insure safety and satisfactory service in installation of piping and approved appliances, and recommended practice in piping, turning on gas, metering, appliance installation and flue connection to meet the requirements.

American Marine Standards Committee. O No. 10–1926. Distinctive Markings for Piping. Charts showing the markings for piping for various services. Markings coincide with those of U. S. Navy.

American Petroleum Institute. Code No. 5; 1928. Care and Use of Oil Country Tubular Goods. Unloading and handling, 10 rules for running casing, strength, use and care of casing, drill pipe, and A. P. I. tubing, reconditioning tubular material.

American Petroleum Institute. Standard No. 3; 1930. Dimensional Standards for Cable Drilling Tools. Includes basic thread form standard for cable drilling tool joints and gages, recommended practice for turning threads.

American Petroleum Institute. Standard No. 7–B; 1931. Rotary Drilling Taper Joints. Includes basic thread form, pitch and taper of joint and essential dimensions for rotary tool joints, fishtail bits, drill collars, rotary driving stem and couplings, swivel gooseneck connections, specifications and tolerances for master tool joint gages.

American Society of Mechanical Engineers, joint sponsor with National Safety Council under procedure of American Standards Assn. A 13–1928. Scheme for the Identification of Piping Systems. Classification of piping according to the character of material carried, assignment of one color to each main class, use of a color band and auxiliary color strip or legend to identify each pipe as to main class and subclass.

American Society of Mechanical Engineers and American Gas Assn. under auspices of American Standards Assn. B 2–1919. Pipe Thread. Formula and table of dimensions for standard taper pipe thread, gages and methods of gaging, gage and working tolerances, table of dimensions of standard straight pipe thread, of standard locknut thread, of standard and extra strong pipe, of corrections in diameter for errors.

National Board of Fire Underwriters. Installation, Maintenance and Use of Piping and Fittings for City Gas; 1920. Applies to gas piping in buildings, minimum sizes of pipe, installation of pipe, types and locations of valves, threading, branching and bending of pipe, pipe supports, size and location of outlets, maintenance rules.

Power Piping Society. Specifications for Power Piping; 1928. Requirements on application of wrought pipe, various types of valves and fittings to steam lines of various pressures and degrees of superheat and to boiler feed water lines, thicknesses and sizes of pipe, materials and structural features of valves and fittings, hydrostatic tests, inspection limits on dimensions, materials and dimensions in accordance with standards of American Standards Assn., steel pipe in accordance with A106–27T of A. S. T. M.

Society of Automotive Engineers. 1931 Handbook. Taper Pipe Thread; 1921. Taper and thread data for pipe up to 6-inch size. Abstracted from American Standards as approved by American Standards Assn.

U. S. Gov., Dept. of Commerce. Bureau of Standards R57; 1926. Wrought-Iron and Wrought-Steel Pipe, Valves, and Fittings. Simplified practice recommended and accepted by industry establishing a limited list of pipe sizes, valve and fittings sizes as standard, with dimensions for standard weight, extra strong, and double extra strong pipe.

U. S. Gov., Federal Specifications Board. 238; 1924. Pipe Threads. Covers taper and straight pipe threads, dimensions of threads for pipe up to 12 inches, gaging requirements, tolerances on dimensions of new inspection gages. Conforms to report of National Screw Thread Commission, 1921 and Am. Standards Assn. standard B2–1919.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Hangers, Supports, Etc. For overhead horizontal pipe runs, required spacing for heavy adjustable wrought or malleable iron hangers, chain, perforated bar iron, or wire hangers not permitted, requirements for heavy wrought iron clamps or collars for vertical runs of pipe.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures. (For Land Use.) Piping. Types of fittings required, methods of making joints, material and application of supports and hangers.

U. S. Gov., National Screw Thread Commission. Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. American National pipe threads. Mandatory for material purchased and used by War and Navy Depts. Requirements on form of thread, length of engagement, and dimensions for taper and straight pipe threads for pipe and couplings, tolerances on gages. Indorsed by Am. Soc. Mech. Engrs. and Am. Gas Assn.

References.—Pipe gaskets. *See* 707.1. Fire hose coupling threads. *See* 974.0.

607.1 CAST-IRON PIPE, FITTINGS, AND CONNECTIONS

607.10 General Items

Associated Factory Mutual Fire Insurance Companies. Rules for Laying Cast-Iron Water Pipes in Factory Yards; 1931. Standards of pipe and fittings for fire-protection purposes, depth of laying and protection of pipe, weight of lead and jute in joints, locating and setting hydrants and gate valves, connection with water supplies, pressure test of pipe after installation.

607.11 Cast-Iron Pipe Culverts, Drains, and Sewers

American Assn. of State Highway Officials. Tentative Method. T–33. Undated. Method of Testing Culvert Pipe. For cast-iron pipe same as C 76–30T of Am. Soc. for Testing Materials, sections 20 to 27.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Cast-Iron Culvert Pipe. Requirements on manufacture and general quality, coating with coal tar, minimum thicknesses for various diameters, transverse test for cast-test specimen, strength requirements under A. S. T. M. method in spec. C 14–24 for drain tile.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Plumbing; 1926. Includes cast-iron soil pipe, extra heavy grade, minimum length, weight, asphaltum coating requirements.

American Society for Testing Materials. A 74–29; 1929. Cast-Iron Soil Pipe and Fittings. General quality, chemical composition, transverse and hydrostatic pressure test requirements, method of coating with pitch, standard weights and dimensions and permissible variations.

U. S. Gov., Federal Specifications Board. 343*a;* 1928. Pipe and Fttings, Soil, Cast Iron, Coated and Uncoated. Covers extra heavy grade of soil pipe, hub and spigot type. Required thicknesses of walls and parts and permissible variations, design of hub and spigot ends, standard dimensions and weights for pipe, weights of bends, tees, and Y branches, hydrostatic test and hammer test requirements for pipe, hammer test requirements for fittings.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Installation rules for pipe. *See* 607.0, 607.10. Other specifications for cast iron. *See* 611.11.

607.12 Cast-Iron Gas and Water Pipe

American Gas Assn. Standard Specifications for Cast-Iron Pipe and Special Castings; 1925. For bell and spigot joint and special castings, tables of dimensions, allowable variation in dimensions and weight, treatment of defective spigots, quality and test of the iron, pressure test of pipe and method of casting.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Cast-Iron Pipe and Special Castings; 1922. The 1908 specifications of American Water Works Assn. have been adopted by the A. R. E. A. and are reprinted in above manual.

American Society for Testing Materials. A 44–04; 1904. Cast-Iron Pipe and Special Castings. Standard dimensions, weights and permissible variations, method of casting, coating of pipe, transverse and hydrostatic test requirements, for hub and spigot joint cast iron pipe. Available in Spanish and French from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Water Works Assn. Cast-Iron Water Pipe and Special Castings; 1908. Tables of dimensions and weights for standard bell and spigot cast-iron pipe for 8 classes of pressure service, dimensions and weights of standard special castings as curves, branches, Ys, reducers, caps and plugs, transverse and hydrostatic pressure test and method of casting requirements.

U. S. Gov., Federal Specifications Board. WW–P–421; 1931. Cast Iron Water Pipe (Bell and Spigot). Covers centrifugally cast types in metal contact molds and in sand-lined molds, and horizontally cast type in sand molds. For 150 and 250 pounds classes. requirements on dimensions, weights, tolerances, coating, construction of cement lining, chemical composition, hardness, transverse and pressure tests.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Installation of pipe. *See* 607.0, 607.10. Other specifications for cast iron. *See* 611.11.

607.13 Cast-Iron Pipe for Railings and Poles

607.14 Cast-Iron Pipe Fittings and Connections

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Pipe Fittings. For cast-iron or semisteel fittings for pressures up to 300 pounds, requirements on general quality and tensile and transverse strengths of the cast iron, design formula for thickness, hydrostatic test of fitting.

American Society of Mechanical Engineers joint sponsor with Heating and Piping Contractors National Assn., and Manufacturers Standardization Society of Valve and Fittings Industry under procedure of American Standards Assn. B 16a–1928. Cast-Iron Pipe Flanges and Flanged Fittings. For 125 steam and 175 hydraulic pressures. Requirements as to tensile strength and maximum sulphur of material, facing and bolting of fittings, tables of dimensions of drilling templates, and of flanged fittings, theoretical weights.

American Society of Mechanical Engineers joint sponsor with Heating and Piping Contractors National Assn. and Manufacturers Standardization Society of Valve and Fittings Industry under procedure of American Standards Assn. Cast Iron Pipe Flanges and Flanged Fittings. Serial B 16b–1928 for fittings rated at 250 pound steam and 400 pound hydraulic pressures. Serial B 16b1–1931 for fittings rated at 800 pound hydraulic pressure. Serial B 16b2–1931 for fittings rated at 25 pound steam pressure. Requirements on chemical composition of cast iron, standard dimensions and thickness of metal for flanges, elbows, tees, etc., dimensions of drilling templates for flanges, theoretical weights. Covers sizes up to 30 inches diameter for the 250 pound steam pressure class, sizes up to 12 inches diameter for the 800 pound hydraulic pressure class, and sizes up to 72 inches for the 25 pound steam pressure class. Requirements on raised faces, number, dimensions, and spacing of bolt holes, sizes of bolts.

American Society of Mechanical Engineers joint sponsor with Heating and Piping Contractors National Assn. and Manufacturers Standardization Society of Valve and Fittings Industry under procedure of American Standard Assn. B 16d–1927. Cast-Iron Screwed Fittings. For steam pressures of 125 and 250 pounds. Tables of dimensions of fittings including center to end dimension and inspection limits for this dimension.

American Society of Mechanical Engineers. Joint sponsor with Heating and Piping Contractors National Assn. and Manufacturers Standardization Society of Valve and Fittings Industry. Approved by American Standards Assn. as B 16g–1929. Cast-Iron Long Turn Sprinkler Fittings (Screwed and Flanged). For maximum hydraulic working pressures of 150 and 250 pounds. Tensile strength and chemical composition requirements for light, medium and heavy castings, dimensions of elbows, tees and crosses for various combinations of flanged and screw ends.

American Society for Testing Materials. A 74–29; 1929. Cast-Iron Soil Pipe and Fittings. General quality, chemical composition, transverse and hydrostatic pressure test requirements, method of coating with pitch, standard weights and dimensions and permissible variations.

American Society for Testing Materials. A 126–30; 1930. Gray Iron Castings for Valves, Flanges, and Pipe Fittings. Covers regular gray iron castings and higher strength gray iron including semisteels, chemical composition, tension, and transverse test requirements.

Heating and Piping Contractors National Assn. Welding Neck Flanges; 1929. Dimensions of flanges for welding on to pipe, for sizes 2-inch to 18-inch, standard and extra heavy flanges for standard and extra heavy pipe.

Refrigerating Machinery Assn. Recommended Practice. Ammonia Pipe Flanges and Flanged Fittings; 1931. Submitted to American Standards Assn. for approval. For cast iron flanges and flanged fittings for pressures up to 300 pounds, requirements on chemical composition and tensile strength of material, strength of steel bolts, thickness of metal, dimensions of elbows, tees, crosses, flanges.

Society of Automotive Engineers. 1931 Handbook. Recommended Practice. Crankcase Drainplugs; 1927. Dimensions and thread of three sizes.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Cast Iron Flanges. For use with iron or steel water and steam pipe on steamships, mandatory requirements on tensile strength of material, depth and thickness of flange.

U. S. Gov., Federal Specifications Board. 343a; 1928. Pipe and Fittings, Soil, Cast-Iron, Coated and Uncoated. Includes extra heavy grade of soil pipe fittings, hub and spigot type. Thicknesses of walls and parts and permissible variations, design of hub and spigot ends, weights of bends, tees, and Y branches, hammer test requirements for fittings.

U. S. Gov., Federal Specifications Board. 489; 1927. Pipe Fittings, Cast-Iron, Threaded. Two types for 125 pounds and 250 pounds, respectively. General quality and construction requirements, standard dimensions and tolerances for ells, tees, crosses, Ys, and couplings, nominal sizes of reducing fittings, hydrostatic or air pressure test requirements.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Installation of pipe. *See* 607.0, 607.10. Threading standards. *See also* 607.0. Other specifications for cast iron. *See* 611.11.

607.2 MALLEABLE IRON PIPE, FITTINGS, AND CONNECTIONS

American Railway Assn. Mechanical Div. Pipe Unions; 1916. Standard dimensions of malleable pipe unions up to 4-inch size.

American Railway Assn. Mechanical Div. Recommended Practice. Unions and Combination Union Fittings, Black and Galvanized, for 300-pound Pressure; 1930. Pipe unions of malleable iron or of steel, for locomotive use, requirements on hydrostatic proof test, tensile-strength test, dimensions of detail parts, standard sizes, for nut and nipple unions, union elbows and union tees, for locomotives.

American Society of Mechanical Engineers joint sponsor with Heating and Piping Contractors National Assn. and Manufacturers Standardization Society of Valve and Fittings Industry under procedure of American Standards Assn. B 16c–1927. Malleable Iron Screwed Fittings. For 150 pounds steam pressure. Tables of dimensions of fittings including dimensions of center to end.

Heating and Piping Contractors National Assn. Welding Neck Flanges; 1929. Dimensions of flanges for welding on to pipe, for sizes 2-inch to 18-inch, standard and extra heavy flanges for standard and extra heavy pipe.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS7–29; 1929. Standard Weight Malleable Iron or Steel Screwed Unions. A commercial standard selected and accepted by industry, covering brass seated black or galvanized unions for standard weight pipe, requirements on dimensions, air pressure tests, and tensile test.

U. S. Gov., Federal Specifications Board, 393; 1926. Unions, Malleable Iron or Steel. Furnished in 2 types, black, brass seated, and galvanized, brass seated, for pressure up to 250 pounds. General quality requirements, dimensions and threads, tensile test and air pressure test requirements for unions, galvanizing requirements for galvanized unions.

U. S. Gov. Federal Specifications Board. 535; 1927. Pipe Fittings, Malleable Iron, Threaded, 150-pound. General quality and hydrostatic test or air pressure test requirements, dimensions and tolerances for ells, tees, couplings, crosses, street ells and tees, return bends and reducing fittings.

U. S. Gov., Federal Specifications Board. 580; 1928. Malleable Iron or Steel Unions, 300-pound. For black and for galvanized unions with and without brass seats, requirements on general quality, threading, dimensions for sizes up to 3-inch, tensile strength, internal pressure test, structural features, and galvanizing, methods of test.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Zinc coatings and tests. *See also* 600.3. Installation, identification, and care of piping. *See* 607.0. Standard threading of pipe. *See* 607.0. Other malleable iron castings. *See* 611.2.

607.3 WROUGHT-IRON PIPE, FITTINGS, AND CONNECTIONS

American Petroleum Institute. Standard No. 5A; 1931. Pipe Specifications. Covers lap-welded and seamless steel and iron tubular goods for oil country purposes including drill pipe, casing and tubing. For wrought-iron or open-hearth iron goods, requirements on manufacture, permissible impurities in open-hearth iron, tensile strength tests, hydrostatic tests, flattening tests, and drift tests, standard weights, lengths, and threads.

American Petroleum Institute. Standard No. 5–L; 1931. Line Pipe. Includes welded iron pipe for conveying gas, water, or oil, including light weight, standard, and extra strong classes, of wrought or open-hearth iron, permissible impurities in open-hearth iron, requirements on tension tests, hydrostatic tests, flattening tests, and bend tests, standard weights, lengths, threads, and thread gages.

American Railway Assn. Mechanical Div. Dimensions and Threads of Wrought Pipe; 1908. Standard dimensions, inside and outside diameter of pipe, thickness of metal, threads per inch, length of perfect screw using Briggs standard section for thread.

American Railway Assn. Mechanical Div. Recommended Practice; 1925. Welded Wrought-Iron Pipe. Black and galvanized iron pipe of coiling or bending quality for locomotives and cars. Materials, tension, hydrostatic, fracture, bend, etch test requirements, standard weights.

American Railway Assn. Signal Section 12324; 1924. One Inch Wrought Iron Signal Pipe. Tensile test requirements, and if required, twist and bend test requirements, threading of pipe and coupling, construction of joint and plug.

American Society for Testing Materials. A 72–31; 1931. Welded-Wrought Iron Pipe. Covers standard weight, extra strong, and double extra strong pipe. Tension, hydrostatic, fracture, and bend test requirements, standard weights and lengths and permissible variation in weight.

Heating and Piping Contractors National Assn. Welding Neck Flanges; 1929. Dimensions of flanges for welding on to pipe, for sizes 2-inch to 18-inch, standard and extra heavy flanges for standard and extra heavy pipe.

U. S. Gov., Dept. of Commerce. Bureau of Standards CS6–31; 1931. Wrought-Iron Pipe Nipples. A commercial standard selected and accepted by industry, requirements on dimensions and threading, nominal weight per foot, for black and galvanized pipe of standard weight, extra strong, and double extra strong, used in making nipples, pipe according to A. S. T. M. Spec. A72–30, standard stock sizes and lengths of nipples.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Welded Steam and Water Pipes of Wrought Iron. For use on steam vessels, mandatory requirements on hydrostatic pressure test for all sizes, on flattening and tensile test for larger sizes, material and general design of flanges.

U. S. Gov., Federal Specifications Board. WW–P–441; 1931. Wrought-Iron Pipe, Welded, Black and Galvanized. For standard weight, extra strong, and double extra strong types, requirements on general quality, type of weld for various sizes, weight of zinc coating, standard weights of pipe, dimensions, tolerances, hydrostatic test, flattening, bend, and tension tests, suitable for steam, water, air, gas, and oil.

U. S. Gov., Federal Specifications Board. WW–N–351; 1930. Pipe Nipples, Brass, Steel and Wrought Iron. For 3 weight grades of wrought-iron nipples as defined in F. S. B. Spec. WW–P–441 for wrought-iron pipe, threading according to F. S. B. Spec. GGG–P–351, requirements on dimensions for close, short, long, and extra long pipe nipples, conforming in dimensions to CS5–29, CS6–29, and CS10–29 of U. S. Dept. of Commerce.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Zinc coatings and tests. *See also* 600.3. Standard pipe sizes. *See also* 607.0. Installation, identification, care of piping. *See also* 607.0. Iron-boiler tubes. *See* 703.2. Wrought-iron conduit for electric wiring. *See* 715.11.

607.4 STEEL PIPE, FITTINGS, AND CONNECTIONS

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Pipe Fittings. For cast-steel fittings for all pressures and temperatures, requirements on tensile and bend test of material, pressures for which flanged end construction required, formula for designing thickness, hydrostatic test.

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Pipes. For lap-welded steel pipes and seamless steel pipe, requirements on tension, flattening, and hydrostatic tests, formula for thickness as related to working pressure, for 2 strength grades of steel.

American Electric Railway Engr. Assn. D11–26; 1926. American Standards Assn. C 13–1926. Specification for Tubular Steel Poles. Material, design, fabrication, drop and deflection tests, weight and dimensions, table showing deflections under load.

American Marine Standards Committee. H No. 21 to H No. 25, incl.; 1927. Tubular Steel Cargo Booms for Ships. H No. 30 and H No. 31. Heel Fittings and Caps for Tubular Steel Booms. For 4 and 5 standard sizes of 5, 10, 15, 20, and 30 ton booms, dimensions, general construction, and tension test requirements of steel for booms, standard sizes and dimensions of fittings.

American Petroleum Institute. Standard No. 5A; 1931. Pipe Specifications. Covers lap-welded and seamless steel and iron tubular goods for oil country purposes including drill pipe, casing and tubing. For steel goods, requirements on chemical composition, tensile strength tests, hydrostatic test, flattening and drift tests, standard weights and lengths, standard threads.

American Petroleum Institute. Standard No. 5–L; 1931. Line Pipe. Applies to welded and seamless steel, and welded iron tubular goods for conveying gas, water, or oil, including light weight, standard and extra strong classes. For steel pipe, requirements on chemical composition, tension, hydrostatic, flattening, and bend tests, standard weights and lengths, threads, thread gages.

American Petroleum Institute. Standard No. 11A and Supplement No. 1; 1931. Oil Well Pumps. Standard dimensions and tolerances for 4 standard sizes of cold drawn and of machined liner working barrels, of plungers, valves, couplings, etc., dimensions of measuring gages for the various parts, tentative standard dimensions for inserted cast-iron liner and cold-drawn barrel pumps.

American Railway Assn. Mechanical Div. Recommended Practice. Unions and Combination Union Fittings, Black and Galvanized for 300-pound Pressure; 1930. Pipe unions of malleable iron or of steel, for locomotive use, requirements on hydrostatic proof test, tensile strength test, dimensions and standard sizes of detail parts of nut and nipple unions, union elbows and union tees, for locomotives.

American Railway Assn. Mechanical Div. Recommended Practice; 1925. Welded and Seamless Steel Pipe. Black and galvanized steel pipe of three strength grades of coiling or bending quality for locomotives and cars. Chemical composition, tension, hydrostatic and flattening test requirements, standard weights.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Hose Clamps, except tank hose, list of recommended standard sizes of hose clamps.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Mechanical Steel Tubing. Dimensions of 70 recommended standard sizes.

American Railway Assn. Signal Section 12227; 1927. One Inch Welded Steel Pipe. For operation of mechanical signal units, chemical composition, tensile properties, weights, dimensions, hydrostatic pressure capacity requirements, test requirements for bending and flattening, threading and joint construction.

American Society of Mechanical Engineers. Joint sponsor with Heating and Piping Contractors National Assn. and Manufacturers Standardization Society of Valve and Fittings Industry under procedure of American Standards Assn. A. S. A. serial B 16e–1927. Steel Pipe Flanges and Flanged Fittings. For steam pressures of 250, 400, 600, 900 and 1,350 pounds and hydraulic pressures of 500 to 2,250 pounds, tension and chemical composition requirements for material, facing and bolting requirements, inspection limits and tables of dimensions of fittings.

American Society for Testing Materials. A 53–30; 1930. Welded and Seamless Steel Pipe. Covers standard weight, extra strong, and double extra strong grades for coiling, bending, flanging and special purposes. Chemical composition and tests, tension, hydrostatic, flattening, and bend test requirements, standard weights and permissible variations.

American Society for Testing Materials. A 95–29; 1929. Carbon Steel Castings for Valves, Flanges and Fittings for High Temperature Service. Heat treatment, chemical composition, tension, bend, and hydrostatic test requirements for materials to be used up to 750° F.

American Society for Testing Materials. A 105–28; 1928. Forged or Rolled Steel Pipe Flanges for High Temperature Service. Three classes of which class A is intended for forge welding. Annealing or normalizing procedure for classes B and C, chemical composition and tests, tension test requirements.

American Society for Testing Materials. A 106–29; 1929. Lap-Welded and Seamless Steel Pipe for High Temperature Service. For working pressures up to 1,350 pounds and for temperatures of 450° to 750° F., covers 2 grades of seamless pipe of which one is suitable for cold bending, fusion, or forge welding. Construction, chemical composition, tension, hydrostatic pressure, flattening and bend test requirements, standard dimensions, weights and permissible variations.

American Society for Testing Materials. Tentative Specifications. A 120–28T; 1928. Black and Hot Dipped Zinc Coated Welded and Seamless Steel Pipe for Ordinary Uses. For low pressure service in steam, water, and gas lines, not intended for close bending or high temperature service, hydrostatic pressure test requirements, standard weights and dimensions for standard weight, extra strong, and double extra strong.

Heating and Piping Contractors National Assn. Welding Neck Flanges; 1929. Dimensions of flanges for welding on to pipe, for sizes 2-inch to 18-inch, standard and extra heavy flanges for standard and extra heavy pipe.

Society of Automotive Engineers. 1931 Handbook. Cable, Conduit and Tubing Clips; 1928. Dimensions of full circle mounting or hold-down clips of soft cold rolled steel.

Society of Automotive Engineers. 1931 Handbook. Cold-Drawn Seamless Steel Tubing; 1911. Dimensions and tolerances up to 3½-inch size.

Society of Automotive Engineers. 1931 Handbook. Water-Pipe Flanges; 1926. Standard dimensions of 5 standard sizes of water pipe flanges for automobile radiators.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS5–29; 1929. Steel Pipe Nipples. A commercial standard selected and accepted by industry, requirements on dimensions and threading, nominal weight per foot, for black and galvanized pipe used for making pipe nipples, standard weight, extra strong, and double extra strong grades, pipe according to A. S. T. M. Spec. A120–28T, standard stock sizes and length of nipples.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS7–29; 1929. Standard Weight Malleable Iron and Steel Screwed Unions. A commercial standard selected and accepted by industry, covering brass seated black or galvanized unions for standard weight pipe, requirements on dimensions, air pressure tests, and tensile test.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Welded and Seamless Steel Steam and Water Pipe. For use on steam vessels, mandatory requirements on absence of surface defects, hydrostatic, flattening, and tensile test, material, general design, and method of attachment of flanges.

U. S. Gov., Federal Specifications Board. 393; 1926. Also No. 580; 1928. Unions, Malleable Iron or Steel. No. 393 for pressures up to 250 pounds, No. 580 for 300 pounds pressure. For black and for galvanized types, brass seated, and for 300 pound type without brass seats, requirements on dimensions, threading, tensile test, internal pressure test, galvanizing, structure.

U. S. Gov., Federal Specifications Board. WW–N–351; 1930. Pipe Nipples, Brass, Steel and Wrought Iron. For 3 weights of steel nipples as defined in F. S. B. spec. WW–P–431 for steel pipe, threading according to F. S. B. Spec. GGG–P–351, requirements on dimensions for close, short, long, and extra long nipples, conforming in dimensions to CS5–29. CS6–29, CS10–29 of U. S. Dept. of Commerce.

U. S. Gov., Federal Specifications Board. WW–P–431; 1930. Welded Steel Pipe, Black and Zinc Coated. For standard weight, extra strong, and double extra strong types, requirements on general physical qualities, standard weights and dimensions and tolerances, hydrostatic test, bend and flattening tests, purity of zinc bath and galvanizing requirements, tension test requirements for extra strong and double extra strong.

References.—Alloy steel tubes and pipe. *See also* 622.3. Methods of testing, general requirements for metals. *See also* 600.1. Zinc coatings and tests. *See also* 600.3. Heat treatments. *See also* 600.5. Standard threading of tubular goods. *See* 607.0. Installation, identification, care of piping. *See* 607.0. Steel conduit for electric wiring. *See* 715.11. Steel boiler tubes. *See* 703.2. Copper slip joints for steam pipes. *See* 642.9. Tubular steel trolley poles. *See* 726.2.

607.5 SHEET IRON AND STEEL PIPE

American Assn. of State Highway Officials. Tentative Specification; M–36. Undated. Base Metal for Corrugated Metal Sheets for Culverts. Chemical composition requirements for pure iron, copper bearing pure iron, copper iron, copper molybdenum iron, copper steel, tolerances on check analysis.

American Assn. of State Highway Officials. Tentative Method T–64. Undated. Method of Test and Inspection of Corrugated Metal Culvert. Requirements on general inspection and measurement of gage, etc., chemical analysis according to A 33–24 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Dept. Circ. 331, of Dept. of Agriculture; 1925. Standard Specifications for Corrugated Metal Pipe Culverts. Approved by Sec. of Agriculture for use in connection with federal-aid road work. Requirements on chemical composition of base metal, tolerance on weights of sheets, weight and application of zinc coating, length and thickness of sheets and width of lap for various pipe sizes, sizes of corrugations and rivets, laying of pipe, etc.

American Electric Railway Engr. Assn. Misc. Methods and Practices. B209–26; 1926. Design of Small Bridges, Culverts, and Trestles. Shows maximum recommended sizes of pipe and drawings of typical designs of concrete box culverts, concrete arch culverts, I-beam spans on concrete abutments, frame and pile trestles.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Corrugated Metal Culvert Pipe for Railroad Use. Requirements on use of open-hearth steel, chemical composition of base metal, size of corrugations, weight tolerance for sheets, lap of longitudinal joints, riveting, end reinforcement, amount of galvanizing, amount of engagement of coupling bands.

National Electric Light Assn. Proceedings, vol. 80. p. 413; 1923. Suggested Specifications for the Fabrication of Riveted Steel Pipe. For hydraulic penstocks to be erected in the field, steel in accordance with A. S. T. M. specifications, strength requirements, shearing, punching, reaming, planing of plates, etc., standard dimensional details for single riveted lap joints, double and triple riveted lap and double butt joints, and for quadruple riveted double butt joints.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Corrugated Galvanized Metal Pipe. Chemical composition requirements for base metal of pure iron, copper-bearing pure iron, copper-iron, copper-molybdenum iron, or copper-steel, permissible variation from theoretical weight, weight and application of galvanizing metal, construction, metal gage, and weight requirements for pipe of various sizes, depth and spacing of corrugations, riveting, and joint construction requirements, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards R29; 1924. Eaves Trough, Conductor Pipe, Conductor Elbows, and Fittings. Simplified practice recommended and accepted by industry establishing a limited list of standard types and sizes and minimum thicknes of material for iron and copper pipe, eaves trough, and elbows.

References.—Iron and steel sheets. *See also* 604.12, 604.29, 604.32. Standard thicknesses of plates and sheets. *See* 604.0. Tolerances on weight and thickness of sheets. *See also* 600.7. Zinc coatings and tests. *See also* 600.3. Rivet steel, rivets. *See also* 603.21, 608.4. Sheet metal piping for warm air heating. *See also* 614.0, 614.4. Masonry culverts. *See also* 518.61. Copper eaves troughs and conductor pipe. *See* 642.9.

607.6 VALVES, COCKS, AND HYDRANTS, FERROUS AND NONFERROUS

American Bottlers of Carbonated Beverages. Educ. Bull. No. 4; 1930. Carbonated Water and Sirup Valves. Recommended designs illustrated of a high pressure valve for carbonated water and a low pressure valve for sirup, particularly suited to the materials handled.

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Valves. For cast-steel, cast-iron, semisteel, or bronze valves, requirements on pressures and temperatures for which each material applicable, flanged end and bolted bonnet type, tensile and bend tests for cast steel, tensile and transverse tests for cast iron, and tensile test requirements for bronze, formula for thickness of material, hydrostatic test for valves.

American Gas Assn. Approval Requirements for Gas Water Heaters; 1928. Includes plug type gas cock, drawing showing minimum dimensions.

American Gas Assn. Standard Gas Fixture Specifications; 1920. Includes construction and some dimensional requirements for standard gas fixture cock.

American Railway Assn. Mechanical Div. Determining the Size of Safety Valves, Their Application to Locomotives and Their Repairs; 1912. Formula for determination of safety valve size from boiler data, number, location, and setting of safety valves, bronze material recommended, standard pipe thread connections for various sizes.

American Railway Assn. Mechanical Div. Tank Cars; 1923. Includes safety valves for tank cars. detail dimensions and design of valve, dimensions and physical properties requirements for valve springs for 25 and 12 pound release pressures.

American Railway Assn. Mechanical Div. Recommended Practice. Triple Valve, Test Requirements for Freight Service; 1911. Required testing apparatus, test procedure and requirements for charging test, service application tests, emergency application tests, for individual triple valve tests and for similar tests on test rack.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. Auxiliary Reservoir Release Valve. Standard ½-inch pipe thread connection for connecting to air brake system.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Hydrants and Valves; 1922. The 1916 specifications of the American Water Works Assn. have been adopted by the A. R. E. A. and are reprinted in above manual.

American Society for Testing Materials. A 95–29; 1929. Carbon Steel Castings for Valves, Flanges and Fittings for High Temperature Service. Heat treatment, chemical composition, tension, bend, and hydrostatic pressure test requirements for materials to be used up to 750° F.

American Society for Testing Materials. A 126–30; 1930. Gray Iron Castings for Valves, Flanges, and Pipe Fittings. Covers regular gray iron castings and higher strength gray iron including semisteels, chemical composition, tension, and transverse test requirements.

American Water Works Assn. Hydrants and Valves; 1916. Transverse test requirements for cast iron, tensile strength of wrought iron and of the noncorrodible metals specified. For valves, construction and noncorrodible material requirements for gate valve stems, weights of valves, sizes of bypasses.

Associated Factory Mutual Fire Insurance Companies. Rubber Facings for Dry Pipe Valves and Check Valves; 1923. Requirements as to percentage of Para Rubber, allowable percentages of organic acetone extract, free sulphur, alcoholic potash ether extract, and total sulphur, plasticity and tensile strength and elongation requirements.

Associated Factory Mutual Fire Insurance Companies. Valves, Indicator Posts and Hydrants; 1930. Requirements for the sizes, material, construction and design, and tests for the following items and their component parts; outside screw and yoke gate valves, inside screw gate valves, straightway and angle hose valves, regular and special swing check valves, indicator posts, hydrants for mill yards.

Chlorine Institute (Inc.). Standard Valve; 1929. For 100, 105, and 150 pound chlorine containers, requirements on design, materials, detail dimensions and design of all parts, chemical composition of brass body of valve and of fusible metal in fusible plug, pressure test requirements, assembly.

Chlorine Institute (Inc.). Standard Valve; 1929. For 1-ton chlorine containers, requirements on design, materials, detail dimensions and design of all parts, assembly, chemical composition of brass in body, pressure test requirements.

Heating and Piping Contractors National Assn. Radiator Valves; 1929. Standard roughing-in dimensions of angle type valves up to 2-inch size.

National Board of Fire Underwriters. Emergency Gas Shut-off Valves; 1924. For valve provided with positive mechanical connection to accessible control for operation by firemen, location and protection of valve, location and construction of pull box, operating handle, and connection from valve to handle.

Power Piping Society. Specifications for Power Piping; 1928. For gate, globe, angle, and check valves. requirements on types, materials of various parts, hydrostatic tests for application of valves to steam lines and feed water lines of various pressures and temperatures, provision of drain bosses on gate valves, materials and dimensions to conform to standards of American Standards Assn.

Refrigerating Machinery Assn. Recommended Practice. Ammonia Pipe Flanges and Flanged Fittings. 1931. Submitted to American Standards Assn. for approval. Includes cast iron ammonia flanged valves for pressures up to 300 pounds, requirements on chemical composition and tensile strength of material, strength of bolts, thickness of metal, dimensions from center to contact surfaces.

Society of Automotive Engineers. 1931 Handbook. Recommended Practice. Drain Cocks. Recommended minimum passage diameters for four sizes from ⅛ to ½ inch thread size.

Underwriters' Laboratories (Inc.). Hazardous Liquid Valves, Construction and Performance; 1930. For valves incorporated in discharge devices at gasoline filling stations and for valves in containers and pipe lines handling gasoline, etc., for shut-off valves, hose nozzle valves, and hose drain valves, requirements on material, thickness of walls, type of joints, engagement of threads, construction of valve, stuffing box, and valve stem, hydrostatic and leakage tests, drop tests for hose nozzle valves, endurance tests.

Underwriters' Laboratories. Pressure Regulators or Reducing Valves; 1928. For reducing storage clyinder pressures in oxygen, acetylene, etc., used in welding and cutting. Normal operation test and excess pressure test requirements.

Underwriters' Laboratories. Outside-Screw-And-Yoke Gate Valves; 1921. Standard sizes for fire systems, materials bronze and cast iron for larger sizes, general design, standard flanges and bell ends, design and dimensions of stems, stuffing boxes, hand wheels, strength test of bronze valve stems, of cast iron for bodies, and pressure test requirements for valve.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Lever Safety Valve. For installation on marine boilers, mandatory requirements on area of valve, length of lever and fulcrum link, width of bearings, general construction and arrangement, materials.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Valves. For use on steam vessels, valves of cast steel, cast iron, semisteel, malleable iron, brass or bronze, mandatory requirements on tensile strength of material, on size limits for each material, hydrostatic pressure test, and on disallowance of screwed bonnets for cast iron valves, for pressures up to 300 pounds.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use.) Ball Cocks. Float-operated supply cock for flush tanks, size, material, working pressure, hush tube requirements, ball float construction, dimensions of lever bearing pins, supply cock of brass.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing fixtures (For Land Use.) Check Valves. Composition of brass, acceptable types of disks for horizontal swing check valves.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use.) Combination Faucet. For compression type faucet, with piping connections, chemical composition of brass, nickel plating requirements and tests, minimum weight of faucet.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use.) Compression Stops. Requirements for working pressure, construction, material, finish, type of handle, standard weight globe pattern valve.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use.) Flushing Valves. Flushometer type of approved pattern, capacity and pressure range for water-closets and urinals, operating requirements, provision of cut-off cocks, size of supply pipe, material and finish of valve.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use.) Gate Valves. For 125 pounds, composition of brass, structural requirements, weight of various sizes up to 4 inches for both flange and screw types, rising and nonrising stems.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use.) Globe and Angle Valves. For 150 pounds, composition of brass, structural requirements, weight up to 2-inch size.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use.) Laundry Tray Bibb. Brass compression type, 2 sizes, as illustrated, minimum weight, nickel plating requirements and test, chemical composition of brass.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use.) Lavatory Supplies, with Compression Faucets. General dimensions and shape of brass compression faucet and handle, minimum weight, chemical composition of brass, nickel plating requirements and tests. For self-closing faucets, addition requirements as to material of spring, pressure against which faucet shall close, bearings and check lug requirements.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures. (For Land Use.) Mixing Valve. General construction requirements and capacity for compression type valve for shower fixtures.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use.) Sill Cock. Brass compression type with flange tapped for ¾-inch pipe, connection for ¾-inch hose as illustrated.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use.) Sink Bibb. Brass compression type, with or without shank and adjustable flange as illustrated, 2 standard sizes, minimum weight, type of handle, nickel plating requirements and tests, chemical composition of brass.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use.) Street Washers. Construction, materials and finish for underground valve in cast-iron box with pipe extensions to surface for hose attachment and valve operating rod, automatic nonfreezing drain.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use.) Wall Hydrant. For ¾-inch hose, construction and materials for pipe extending through wall with valve inside of building and hose connection and valve operating key on outside.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Zinc coatings, nickel plating. *See also* 600.3. Plumbing practice and symbols. *See also* 600.6. Standard pipe threads, valve sizes. *See also* 607.0. Installation, identification, care of piping. *See also* 607.0. Plumbing fixtures. *See also* 617.7. Cast carbon steel, cast alloy steel. *See also* 611.4, 622.5. Cast iron. *See also* 611.11. Cast brass and bronze. *See also* 645.21, 646.41. Rubber pump valves. *See* 707.3. Fire hydrant outlet threading. *See* 974.0. Pneumatic tire valves. *See* 206.3, 206.4. Brass ingot metal for valves. *See* 644.11. Flange fittings for valves. *See also* 607.14, 607.2, 607.3, 607.4.

607.7 METALLIC HOSE, FERROUS AND NONFERROUS

American Marine Standards Committee. O No. 2–1926. Specification for ¾-inch and 2-inch Flexible Metallic Hose. Description, hydrostatic test requirements, fittings, standard lengths.

Society of Automotive Engineers. 1931 Handbook. Recommended Practice. Flexible Steel Conduit and Tubing; 1926. Includes flexible steel tubing for carbureter intake and for exhaust and heater tubing, of square locked and interlocked types, construction details, rust proof coating, dimensions, tension test, breaking test, and corrosion test requirements.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Rust-proof coatings. *See also* 600.3. Rubber metal gasoline hose. *See* 202.32. Flexible metallic conduit for electric wiring. *See* 715.11. Flexible metallic casing for tachometer drive. *See* 724.22.

608. NAILS, SCREWS, BOLTS, NUTS, AND RIVETS

608.0 GENERAL ITEMS

American Railway Assn. Mechanical Div. Screw Threads; 1926. The Sellers or Franklin Institute (U. S. Standard) system of screw threads, bolt heads and nuts, is standard of A. R. A. except for pipe work and special locomotive work.

American Society of Mechanical Engineers. Joint Sponsor with Society of Automotive Engineers under procedure of American Standards Assn. B 1a–1924. American Standard Screw Threads for Bolts, Machine Screws, Nuts, and Commercially Tapped Holes. Definitions, form of thread, classification of fits, tables giving dimensions of threads for various fits for the coarse thread and the fine thread series.

Society of Automotive Engineers. 1931 Handbook. Screw Threads; 1926. Basic diameters and thread data for standard screw series for coarse thread, for fine thread, extra fine thread, for fine thread over 1½-inch diameter series, loose, free, and medium fit data for screws and nuts in above series, applications of various series and fits. Approved as an American Standard by American Standards Assn.

Society of Automotive Engineers. 1931 Handbook. Tap Drill Reference Tables; 1930. Tables giving the nearest drill sizes for the basic, maximum, and minimum minor diameters specified in American Standard for Screw Threads, for extra fine, fine, and coarse threads, tap sizes and corresponding tap-drill sizes for coarse and fine threads.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS24–30; 1930. American National Standard Screw Threads (Coarse and Fine Thread Series.) A commercial standard accepted by industry, making available for convenient use six of the most essential tables of dimensions of fastening screws as published in the 1928 Report of the National Screw Thread Commission (Sec. III and Appendix 4), Bureau of Standards publication M89.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS25–30; 1930. American National Special Screw Threads. A commercial standard accepted by industry and presenting in compact form the tables of dimensions of special screw threads having the American National form of thread (60°) as published in 1928 report of National Screw Thread Commission (Secs. IV and XD), Bur. Standards Publ. M89.

U. S. Gov., National Screw Thread Commission. Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. American National Acme Screw Threads. Thread profile dimensions, recommended pitches and corresponding mimimum diameters, definitions of 4 classes of fits, 2 for traversing screws and 2 for lead screws, allowances, thread proportions, pitch, diameter and length of engagement increments, tolerences on gages.

U. S. Gov., National Screw Thread Commission. Publ. M89 of Bureau of Standards; 1929. Report of Nat'l Screw Thread Commission; 1928. Screw threads for bolts, machine screws, nuts, tapped holes, etc. Mandatory requirements for material purchased and used by the War and Navy Depts., including standard form of thread, standard dimensions of coarse thread series and of fine thread series, definitions of 4 classes of fits with tables of allowances and tolerances. Includes sizes taken from the standards of Am. Soc. of Mech. Engrs. and Soc. of Automotive Engrs.

U. S. Gov., National Screw Thread Commission. Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. Screw threads of special diameters, pitches, and lengths of engagement. Mandatory for material purchased and used by War and Navy Depts. Recommended pitches with special recommendation of 12 threads per inch, dimensions of threads of standard profile for 4 classes of fit.

U. S. Gov., National Screw Thread Commission. Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. Wrench fit for threaded studs (tentative specifications). Covers a class 5 of wrench fit not included in National American standards, dimensions, allowances and tolerances for studs and tapped holes for coarse threaded studs and fine threaded studs in hard material.

U. S. Gov., National Screw Thread Commission. Publ. M98 and M99 of Nat. Bureau of Standards. American National Screw Thread Tables for Shop Use. Essential tables of 1928 report of N. S. T. C. are published in a more convenient form, M98 for standard threads of coarse and fine series and M99 for special threads.

608.1 NAILS, BRADS, STAPLES, AND TACKS

608.11 Nails

American Railway Engineering Assn. 1929 Manual and 1930 Supplement to 1929 Manual. Dating Nails. For dating railroad ties, to be of iron or steel, galvanized; requirements on test for thickness of zinc coating, dimensions and design of nail and of figures.

American Society for Testing Materials. D 249–27; 1927. Heavy Weight Slate Surfaced Asphalt Roll-Roofing and Heavy Weight Slate Surfaced Asphalt Shingles. Includes specifications for nails, limiting gage sizes, minimum diameter of head, lengths, and zinc coating requirements, nailing requirements for roll-roofing.

Asphalt Shingle and Roofing Institute. Nails. Zinc in Protective Coating; 1921. Recommends hydrochloric acid-antimony chloride method for determining amount of zinc in protective coating, apparatus requirements, test procedure.

Asphalt Shingle and Roofing Institute. Nails to be Used for Laying Composition Shingles; 1921. For smooth or barbed zinc coated nails, gauge of wire, length of nail, size of head, size of barbed shank, count per pound, amount of zinc coating.

Asphalt Shingle and Roofing Institute. Nails to be Used for Laying Roll Roofing; 1920. For smooth or barbed zinc coated nails, gage of wire, length of nail, size of head, count per pound, amount of zinc coating.

Asphalt Shingle and Roofing Institute. Recommended Test. Nails, Accelerated Corrosion Test; 1923. Use salt spray test described in Bureau of Standards Circular No. 80, dimensions and design of test box, preparation of solution and some test requirements.

Underwriters Laboratories. Class C Asphalt Rag-Felt Sheet Roofing and Shingles; 1929. Nails for sheet roofing, requirements on dimensions of nail and head, and amount of zinc coating.

U. S. Gov., Dept of Commerce. Bureau of Standards. R47–28; 1928. Cut Tacks and Small Cut Nails. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes, styles, and finishes for clout nails, trunk and basket nails, shoe nails and tacks, and various other types of tacks.

U. S. Gov., Federal Specifications Board. 214; 1924. Asphalt Prepared Roofing. Includes specifications for zinc coated roofing nails, gage of wire, diameter and thickness of head, length of shank.

U. S. Gov., Federal Specifications Board. 423; 1926. Slate Surfaced Asphalt and Asbestos Prepared Roofing. Includes roofing nails, requirements on gage of wire size and thickness of head, length of shank, coating with zinc.

U. S. Gov., Federal Specifications Board. 534; 1927. Nails, Spikes, Tacks, and Staples. Box, Basket, Barrel, and Broom Nails. For iron, steel, copper, zinc, brass, Muntz metal, and copper bearing steel nails, with various coatings of zinc, tin, cement, and brass, chemical composition and ductility requirements of materials, requirements for coating, dimensions, tolerances, and weights for various sizes and finishes of box, barrel, basket, and broom nails.

U. S. Gov., Federal Specifications Board. 534; 1927. Nails, Spikes, Tacks, and Staples. Builders Nails. Iron, steel, copper, zinc, brass, Muntz metal, and copper bearing steel, nails, with various coatings of zinc, tin, cement, and brass, chemical composition and ductility requirements of material, requirements for coatings, dimensions, tolerances, and weight for various sizes and finishes of barbed nails, boat nails, brads, and for car, casing, cement, clinch, clout, and common nails, cut nails, double head, finishing, flooring, and hinge nails, lath nails for wood and metal lath, plaster board, purlin, roofing, sheathing, and shingle nails, siding, slating, and stem nails, dowel and escutcheon pins, copper storm nails, foundry nails.

U. S. Gov., Federal Specifications Board. 534; 1927. Nails, Spikes, Tacks, and Staples. Cobblers, Saddlers, and Upholsterers Nails. For iron, steel, copper, zinc, brass, Muntz metal, and copper bearing steel nails, chemical composition and ductility requirements for materials, dimensions, tolerances, and weights for various sizes of iron and steel wire and cut heel nails, iron or steel hob and shoe nails, saddle and saddlery nails, and upholsterers nails.

U. S. Gov., Federal Specifications Board. 534; 1927. Nails, Spikes, Tacks, and Staples. Fence Nails. For iron, steel, copper, zinc, brass, Muntz metal, and copper bearing steel fence nails, smooth, or cement coated wire nails, plain or zinc coated cut fence nails, chemical composition and ductility requirements for materials, requirements for coatings, dimensions, tolerances, and weight for various sizes and finishes of wire and cut fence nails.

U. S. Gov., Federal Specifications Board. 534; 1927. Nails, Spikes, Tacks, and Staples. Horse Nails. Chemical composition and ductility requirements of material, dimensions, tolerances and weights for various sizes of horse nails.

U. S. Gov., Federal Specifications Board. NN–B–621; 1930. Wood Boxes, Nailed and Lock-Corner. Includes cooler nails, sinker nails, and standard box nails, requirements on length, diameter, and steel wire gage number for sizes from 2-penny to 10-penny.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Noncorrosive coatings and test. *See also* 600.3. Steel and iron wire gages. *See* 603.40.

608.12 Brads

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Wire Brads, list of recommended standard sizes.

U. S. Gov., Federal Specifications Board. 534; 1927. Nails, Spikes, Tacks, and Staples. Brads. For iron, steel, copper, zinc, brass, Muntz metal, and copper bearing steel brads, with various coatings of zinc, tin, cement, and brass, chemical composition and ductility requirements of material, requirements for coatings, dimensions, tolerances, and weight for various finishes and sizes of common brads, flooring brads, and moulding nails.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Noncorrosive coatings and test. *See also* 600.3. Steel and iron wire gages. *See* 603.40.

608.13 Staples

American Railway Engineering Assn. 1929 Manual. Standard Right-of-Way Fences; 1926. Includes staples, size of galvanized steel wire stock, lengths for hardwoods and for softwoods.

National Electric Light Assn. Suggested Specifications D315–22; 1922. Staple. Dimensions and allowable variations for 2 and 3 inch steel staples, material according to N. E. L. A. specifications D200–22, galvanizing according to D210–22. Published in 1924 N. E. A. L. proceedings.

U. S. Gov., Federal Specifications Board. 534; 1927. Nails, Spikes, Tacks, and Staples. Staples. Electricians staples, metal lath staples, poultry netting staples, wire fence staples, and double pointed tacks, bright, coppered, and zinc coated finishes, chemical composition and ductility requirements for materials, requirements and tests for coatings, dimensions, tolerances, and weights of various sizes.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Noncorrosive coatings and tests. *See also* 600.3. Steel and iron wire gages. *See* 603.40.

608.14 Tacks

U. S. Gov., Dept. of Commerce. Bureau of Standards. R47–28; 1928. Cut Tacks and Small Cut Nails. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes, style, and finishes for bill posters tacks, carpet, upholsterer, trimmer, basket, trunk, solid head lining, gimp, lace, hide tacks, clout nails, trunk and basket nails, copper and galvanized tacks, shoe nails and tacks.

U. S. Gov., Federal Specifications Board. 534; 1927. Nails, Spikes, Tacks, and Staples. Tacks. Bill posters tacks, carpet tacks, copper or brass tacks, galvanized tacks, double pointed tacks, gimp tacks, saddle tacks, shoe tacks, upholsterers tacks. Chemical composition and ductility requirements for materials, requirements for coatings, dimensions, tolerances, and weights for various sizes.

U. S. Gov., Federal Specifications Board. 600; 1928. Thumbtacks. For nickel-silver heads, brass or steel heads, stamped steel tacks, center pull tacks, colored head thumbtacks, requirements on materials for each type, general design and construction of each type, packing.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Noncorrosive coatings and tests. *See also* 600.3. Steel and iron wire gage. *See* 603.40.

608.15 Spikes

U. S. Gov., Federal Specifications Board. 534; 1927. Nails, Spikes, Tacks, and Staples. Spikes. Barge and boat spikes, common cut iron or steel spikes, gutter spikes, round wire spikes, track spikes. For iron, steel, copper, zinc, brass, Muntz metal, or copper bearing steel spikes, plain or zinc coated, chemical composition and ductility requirements for materials, requirements for coating, dimensions, tolerances, and weights for various sizes.

References.—Railway track spikes. *See* 606.5. Methods of testing, general requirements for metals. *See also* 600.1. Steel and iron wire gages. *See* 603.40.

608.2 SCREWS

American Electric Railway Engr. Assn. Recommended Specification D102–29; 1929. Overhead Line Material for Direct and Catenary Suspension. Includes steel lag screws, requirements on construction, dimensions and permissible variations for 2 sizes, material according to A. S. T. M. spec. A–9 for structural steel.

American Marine Standards Committee. E No. 11–1927. Propeller Hub Studs, Nuts, and Lock Screws. For lock screws, dimensions of standard sizes, threading requirements, corresponding to nut sizes from 1½ to 4½ inches, workmanship and quality of materials in conformity with standards of Am. Bureau of Shipping.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stock; 1930. Report of committee recommending list of standard sizes to be carried in stock of flat, oval, and round head brass wood screws, of flat and round head iron wood screws, of flat, oval, and round head brass machine screws, and of flat, fillister, and round head iron machine screws.

American Railway Assn. Telegraph and Telephone Section. 1–A–20; 1927. Pole Line Hardware. Includes ⅜ inch and ½ inch fetter drive screw, mild steel, galvanized, dimensions and tolerances, tensile and bend test requirements for the steel stock.

American Society of Mechanical Engineers. Joint Sponsor with Society of Automotive Engineers under procedure of American Standards Assn. A. S. A. serial B 18b–1927. Wrench Head Bolts and Nuts and Wrench Openings. Includes cap screws, dimensions and tolerances for hexagonal cap screw heads adopted as standard.

American Society of Mechanical Engineers and Society of Automotive Engineers, sponsors, approved by American Standards Assn. as B 18c–1930. Slotted Head Proportions of Machine Screws, Cap Screws, and Wood Screws. Head and slot proportions for slotted flat head, round head, oval head, fillister head machine screws and for flat head, button head, and fillister cap screws, and for round head, flat head, and oval head wood screws, including brass wood screws.

National Electric Light Assn. Suggested Specifications. Publ. No. 289–45; Spec. D264–28T. Tentative, 1928. ¼-inch Lag Screw. D264.1–28T. Tentative, 1928. ⅜-inch Lag Screw. Dimensions for 2 sizes of each with allowable variations, for steel lag screws, material according to N. E. L. A. Spec. D200–22, galvanizing according to D210–22.

National Electric Light Assn. Suggested Specifications. D265–22; 1922. ½-inch Lag Screw. D266–22; 1922. ⅝-inch Lag Screw. Dimensions and allowable variations for steel lag screws, material according to N. E. L. A. specifications D200–22 and D209–22, galvanizing according to D210–22. Published in 1924 N. E. L. A. proceedings.

Society of Automotive Engineers. 1931 Handbook. Cap Screws, Bolts and Nuts, and Wrench Openings; 1930. Standard dimensions of steel, finished hexagonal cap screws, set screws, flat head, oval head, fillister head, and round head machine screws, flat head, fillister head, and button head cap screws. The first two listed conform to American Standards, the others conform to April 1929 report of committee on bolt, nut and rivet proportions under American Standards Assn. procedure.

Society of Automotive Engineers. 1931 Handbook. Wood Screws; 1930. Dimensional standards of round head wood screws, flat head wood screws, and oval head wood screws, length tolerances. Conform to April 1929 report of committee on bolt, nut, and rivet proportions under American Standards Assn. procedure.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS37–31; 1931. Steel Bone Plates and Screws. A commercial standard selected and adopted by industry for bone plates, includes requirements on chemical composition, design, dimensions, and hardness for 11 sizes of self tapping screws made of chromium-vanadium steel.

U. S. Gov., Federal Specifications Board. FF–S–111; 1931. Screws, Wood. Standard size numbers, diameters, and pitches, dimensions and tolerances for oval head, round head, and flat head screws, standard sizes of steel screws and of brass screws.

U. S. Gov., Federal Specifications Board. 548; 1928. Bolts, Nuts, and Machine Screws. Includes cap screws, of hexagon-head, flat-head, button-head, and oval fillister-head designs, machine screws, headed and headless set screws, dimensions, general design, tension and bend test requirements.

U. S. Gov., National Screw Thread Commission. Cap Screws. Standards of N. S. T. C. for cap screws have been adopted by Federal Specifications Board and are incorporated in Specification No. 548.

U. S. Gov., National Screw Thread Commission. Wood Screws. Standards of N. S. T. C. for wood screws have been adopted by Federal Specifications Board and are incorporated in Specification FF–S–111.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Noncorrosive coatings and tests. *See also* 600.3. Standard threads. *See also* 608.0. Bolt and screw stock steel. *See also* 603.21. Brass screw stock. *See* 645.11. Rigging screws. *See* 608.7. Packaging of lag bolts. *See* 608.31.

608.3 BOLTS AND NUTS, EXCEPT RAILWAY TRACK BOLTS

608.30 General Items

National Electric Light Assn. Suggested Specification. D209–22; 1922. Bolts and Nuts (General). Heads and nuts with one face rounded or chamfered, threads per inch for different sizes using U. S. standard threads, eyes of bolts or anchor rods to be forged. Published in 1924 N. E. L. A. proceedings.

608.31 Bolts

American Electric Railway Engr. Assn. Recommended Specification. D102–29; 1929. Overhead Line Materials for Direct and Catenary Suspension. Includes guy anchor bolts, guy clamp bolts, anchor rods, carriage bolts, eye bolts, spacing bolts, stud bolts, tap bolts, and through bolts, requirements on construction, dimensions and permissible variations, steel according to A. S. T. M. Spec. A–9 for structural steel.

American Marine Standards Committee. E No. 11–1927. Propeller Hub Studs, Nuts, and Lock Screws. For collar studs and plain studs, dimensions and threading of standard sizes from 1½ inch to 4½ inch, quality of materials and workmanship in conformity with standards of Am. Bureau of Shipping.

American Railway Assn. Mechanical Div. Recommended Practice; 1916. Specifications for Bolts and Nuts. Table of dimensions of threads, of hexagonal and square nuts and bolt heads of wrought iron or steel with material according to A. R. A. specifications.

American Railway Assn. Mechanical Div. Castle Nuts, Cotter Pins, and Location of Cotter Pinholes in Projecting Bolt Ends; 1926. For bolt ends, size, and location of cotter pin holes for use with castle nuts, for bolt sizes ½ to 3½ inches.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stock; 1926. Carriage Bolts, Square Head Machine Bolts. Dimensions of recommended standard sizes.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Flexible Staybolts. Recommends 1 inch steps in lengths of the generally used sizes and two inch steps for longer lengths.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Stove Bolts. List of sizes of flat head and round head stove bolts recommended as standard.

American Railway Assn. Telegraph and Telephone Section. 1–A–20; 1927. Pole Line Hardware. Includes ⅝ inch carriage bolt, crossarm bolt, double arming bolt, ½ inch machine bolt, material, dimensions, finish and assembly requirements, tensile and bend test requirements for the steel.

American Society of Mechanical Engineers. Joint sponsor with National Machine Tool Builders Assn., and Society of Automotive Engineers under procedure of American Standards Assn. B 5a–1927. T Slots, their Bolts, Nuts, Tongues and Cutters. Tables of dimensions and tolerances of standard sizes.

American Society of Mechanical Engineers. Joint sponsor with Society of Automotive Engineers under procedure of American Standards Assn. A. S. A. serial B 18b–1927. Wrench Head Bolts and Nuts and Wrench Openings. Tables of dimensions and tolerances for square and hexagonal bolt heads, nuts, hexagonal cap screw heads, machine screw and stove bolt screw nuts, and open end wrench openings.

American Society of Mechanical Engineers. Joint sponsor with Society of Automotive Engineers under procedure of American Standards Assn. B 18e–1928. Round Unslotted Head Bolts. Tables of dimension and threads for square neck, fin neck, and ribbed carriage bolts, for step bolt, for button head machine bolt, and for countersunk carriage bolt.

American Society of Mechanical Engineers. Joint sponsor with Society of Automotive Engineers under procedure of American Standards Assn. A. S. A. serial B 18f–1928. Plow Bolts. Tables of dimensions and threads for round head, square neck; for square head; for round head, heavy key; for round head reverse key countersunk plow bolts.

National Electric Light Assn. Suggested Specification; D235–22; 1922. ⅜-inch Carriage Bolt. Dimensions and allowable variations for 4 to 5 inch sizes, steel according to N. E. L. A. spec. D 200–22 and D 209–22, galvanizing according to N. E. L. A. spec. D210–22. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications. D240–22; 1922. ⅜-inch Machine Bolt. D243–22; 1922. ½-inch Machine Bolt. D246–22; 1922. ⅝-inch Machine Bolt. Dimensions and allowable variations, material according to N. E. L. A. spec. D200–22 and D209–22, galvanizing according to N. E. L. A. spec. D210–22, material steel. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specification. D250–22; 1922. ⅝-inch Double Arm Bolt. For attachment of crossarms to poles, dimensions and allowable variations, material according to N. E. L. A. specifications D200–22 and D209–22, galvanizing according to D210–22, material steel. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications. D255–22; 1922. ½-inch Eye Bolt. D257–23; 1923. ⅝-inch Eye Bolt. Dimensions and allowable variations, material according to N. E. L. A. specifications D200–22 and D209–22, galvanized according to D210–22, material steel. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications. D330–28T; 1928. Tentative. ¼-inch Expansion Bolt. D332–28T; 1928. Tentative. ½-inch Expansion Bolt. For steel bolt with lead alloy sleeve and cast iron cone, dimensions and allowable variations, material according to N. E. L. A. specifications D200–22 and D209–22, galvanizing according to D210–22.

Society of Automotive Engineers. 1931 Handbook. Cap Screws, Bolts and Nuts, and Wrench Openings; 1930. Includes standard dimensions of rough and semifinished square and hexagonal regular bolt heads, finished square and hexagonal bolt heads. In conformity with standards of American Standards Assn.

Society of Automotive Engineers. 1931 Handbook. Eye Bolts, Aeronautic. 1928. Bend and tensile strength requirements, dimensions.

Society of Automotive Engineers. 1931 Handbook. Plain Hexagon Head Bolts, Aeronautic; 1928. Tensile strength and bend test requirements, dimensions of sizes No. 8 to ⅝.

Society of Automotive Engineers. 1931 Handbook. Round Unslotted-Head Bolts; 1929. Dimensions of square neck carriage bolts, fin-neck carriage bolt, ribbed carriage bolt, step bolt, button-head machine bolt, countersunk carriage bolt.

Society of Automotive Engineers. 1931 Handbook. Spring Center Bolts; 1931. Standard dimensions and type of thread for center bolts for springs for passenger automobiles and motor trucks.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R23–29; 1929. Plow Bolts. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes and types of plow bolts.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R60–30; 1930. Packaging of Carriage, Machine, and Lag Bolts. Simplified practice recommended and accepted by industry establishing standard packings for bolts, with number and gross weight of various sizes in packages for full case packing (bolts papered or in cartons) and for bulk packing and bulk packing in cases or kegs.

U. S. Gov., Federal Specifications Board. 548; 1928. Bolts, Nuts, and Machine Screws. Machine bolts and nuts, rough, semifinished, and finished; cap screws, machine screws, stove bolts, round unslotted-head bolts; set screws, studs, tap bolts, tap rivets. Machine bolts made by pressing, punching, or forging, dimensions, tension test, and bend test requirements for machine bolts, square neck, fin neck, and ribbed carriage bolts, step bolts, button-head machine bolts, countersunk carriage bolts, tap bolts, studs and tap rivets.

U. S. Gov., National Screw Thread Commission. Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1929. Wrench head bolts and nuts and wrench openings. Standards are the same as those of Am. Soc. of Mech. Engrs. and Soc. of Auto. Engrs. given in American Standards Assn. serial B 18b–1927.

References.—Alloy steel bolts. *See* 622.1. Methods of testing, general requirements for metals. *See also* 600.1. Noncorrosive coatings and tests. *See also* 600.3. Standard threads and threading. *See also* 608.0, 608.30. Stock for steel and alloy steel bolts. *See also* 603.21, 622.1.

608.32 Nuts

American Electric Railway Engr. Assn. Recommended Specification. D102–29; 1929. Overhead Line Materials for Direct and Catenary Suspension. Nuts. General requirements on looseness of fit.

American Marine Standards Committee. E No. 7–1927. Propeller Nuts. Standard sizes and dimensions, for tail shafts from 5 to 20 inches in diameter.

American Marine Standards Committee. E No. 11–1927. Propeller Hub Studs, Nuts and Lock Screws. For collar studs, plain studs, nuts and lock screws, dimensions of standard sizes for sizes 1½ to 4½ inches, threading requirements, workmanship and quality of materials in conformity with standards of Am. Bureau of Shipping.

American Railway Assn. Mechanical Div. Recommended Practice; 1916. Specifications for Bolts and Nuts. Table of dimension of threads, of hexagonal and square nuts and bolt heads of wrought iron or steel with material according to A. R. A. Specifications.

American Railway Assn. Mechanical Div. Castle Nuts, Cotter Pins and Location of Cotter Pin Holes; 1926. For castle nuts, standard dimensions and design for standard castle nuts and for thin nuts, number of threads.

American Society of Mechanical Engineers. Joint sponsor with National Machine Tool Builders Assn. and Society of Automotive Engineers under procedure of American Standards Assn. B 5a–1927. T Slots, Their Bolts, Nuts, Tongues and Cutters. Tables of dimensions and tolerances of standard sizes.

American Society of Mechanical Engineers. Joint sponsor with Society of Automotive Engineers under procedure of American Standards Assn. B 18b–1927. Wrench Head Bolts and Nuts and Wrench Openings. Tables of dimensions and tolerances for square and hexagonal bolt heads, nuts, hexagonal cap screw heads, set screw heads, machine screw and stove bolt screw nuts, and open end wrench openings.

Society of Automotive Engineers. 1931 Handbook. Cap Screws, Bolts and Nuts, and Wrench Openings; 1930. Includes standard dimensions of rough, semifinished, and finished square and hexagonal nuts, finished and semifinished hexagonal jam nuts, hexagonal plain nuts (fine threads), hexagonal and square machine screw and stove bolt nuts, and hexagonal castellated nuts. Approved by American Standards Assn. as American Standards.

Society of Automotive Engineers. 1931 Handbook. Castle Hexagon-Nuts, Aeronautic; 1928. Dimensions of standard nuts for bolt sizes No. 8 to ⅝, diameter distortion test, tension test requirements of the bar steel stock.

Society of Automotive Engineers. 1931 Handbook. High Nuts; 1930. Dimensions of standard thick nuts with slot and cotter pin hole dimensions.

Society of Automotive Engineers. 1931 Handbook. Plain Hexagonal Nuts, Aeronautic; 1928. Dimensions of nuts for bolt sizes No. 8 to ⅝, tensile test requirements of the bar steel stock, diameter distortion test of nuts.

Society of Automotive Engineers. 1931 Handbook. Recommended Practice. Propeller Blade Clamp Rings, Bolts and Nuts, Aeronautic; 1929. For the carbon steel nuts and alloy steel bolts, dimensions and design of 2 recommended standard sizes, composition of the steel.

U. S. Gov., Federal Specifications Board. 548; 1928. Bolts, Nuts, and Machine Screws. Includes square and hexagon machine bolt nuts, castellated nuts, jam nuts, hexagon light nuts, hexagon and square machine screw nuts, square stove bolt nuts, made by hot forging, punching, or machining from bar stock, dimensions, general design, cold drift and flattening test requirements.

U. S. Gov., National Screw Thread Commission. Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. Wrench head bolts and nuts and wrench openings. Standards are the same as those of Am. Soc. of Mech. Engrs. and Soc. of Auto. Engrs. given in Am. Standards Assn. serial B 18b–1927.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Noncorrosive coatings and tests. *See also* 600.3. Standard threads and threading. *See also* 608.0, 608.30. Stock for steel and alloy steel bolts. *See also* 603.21, 622.1. Lock nuts for ball bearings. *See* 766.2.

608.4 RIVETS, IRON OR STEEL

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Iron rivets. Requirements on cold bend test, and hot flattening of head test.

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Rivets for boilers. Requirements on tension test of rivet bar, on bending and flattening test of rivets.

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steel Rivets. Requirements on tension test for rivet bars, cold bending and hot flattening test for rivets.

American Railway Assn. Mechanical Div. Rivet Steel and Rivets for Locomotive Tenders, Passenger and Freight Equipment Cars; 1925. Chemical composition. tension, bend, and flattening test requirements, dimensions and permissible variations.

American Railway Assn. Mechanical Div. Recommended Practice; 1923. Rivet Steel and Rivets for Steam Boilers and other Pressure Vessels. Chemical composition, tension, bend and flattening test requirements, permissible variations in dimensions.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stock; 1926. Locomotive Boiler Rivets, Structural Rivets. Dimensions of recommended standard sizes.

American Society of Mechanical Engineers. Joint sponsor with Society of Automotive Engineers under procedure of American Standards Assn. B 18a–1927. Small Rivets, under $\frac{7}{16}$-inch diameter. Chemical composition, strength, ductility, and hardness tests for the rivet material, tables of standard dimensions and tolerances for the standard types, flat head, countersunk head, button head, pan head, and truss or wagon-box head rivets.

American Society of Mechanical Engineers. Joint sponsor with Society of Automotive Engineers under procedure of American Standards Assn. A. S. A. serial B 18g–1929. Tinners, Coopers' and Belt Rivets. Chemical composition, strength, ductility, and hardness requirements for the steel, tables of dimensions for the rivets.

American Society for Testing Materials. A 13–24; 1924. Rivet Steel for Ships. For rolled bars, required chemical composition and tests, tension and bend test requirements, permissible variation in diameter; for the rivets, bend and flattening test requirements.

American Society for Testing Materials. A 31–24; 1924. Boiler Rivet Steel. Chemical composition and tests, tension and bend test requirements, permissible variations in diameter for the rolled bar, bending and flattening test requirements and variation in diameter for the rivets. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

Society of Automotive Engineers. 1931 Handbook. Split and Tubular Rivets; 1929. Dimensions of tubular rivets of flat head, oval head, cupped countersunk head, flat countersunk head types, dimensions of split rivets of flat countersunk and oval head type, dimensions of rivet caps, for brass, wrought iron, or steel rivets.

U. S. Gov., Federal Specifications Board. 548; 1928. Bolts, Nuts, and Machine Screws. For threaded tap rivets, standard dimensions of tap rivet heads for 7 sizes up to 1¼ inches.

References.—Alloy steel rivets. *See* 622.9. Methods of test, general requirements for metals. *See also* 600.1. Noncorrosive coatings and tests. *See also* 600.3. Stock for steel and alloy steel rivets. *See also* 603.21, 621.31.

608.5 PINS AND SHAFT KEYS

608.51 Pins, Cotter, Dowel, Rod End Pins, Etc.

American Railway Assn. Mechanical Div. Castle Nuts, Cotter Pins, etc.; 1926. For cotter pins and for taper pins, standard dimensions for 14 sizes of cotter pins, length and taper of 15 sizes of taper pins.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Cotter Keys. List of recommended standard sizes.

Society of Automotive Engineers. 1931 Handbook. Cotter Pins; 1923. Dimensions, up to 3 inches long, of standard sizes.

Society of Automotive Engineers. 1931 Handbook. Flat Head Pins, Aeronautic; 1930. Standard dimensions and minimum shear strength of cylindrical pins for 9 sizes from ⅛ to ⅝ inch.

References.—Methods of testing general requirements for metals. *See also* 600.1. Bolt and rivet steel stock. *See also* 603.21. Rod ends and pins, automotive. *See* 722.33.

608.52 Shaft Keys

American Marine Standards Committee. E No. 6–1927. Propeller Keys. Dimensional drawing with dimensions of 16 standard sizes of keys and securing screws for tail shafts from 5 to 20 inches in diameter.

American Petroleum Institute. Standard No. 6. 1930. Rig Iron Standards. For gib head taper keys and keyways for 4 to 6 inch standard sand reel and crank shafts, requirements on dimensions and tolerances.

American Petroleum Institute. Standard No. 7; 1930. Transmission Standards. Standards on shafting and square, flat, and taper keys given were selected from American Standards on Shafting and Keys of American Standards Assn. B–17a, B–17b, B–17d, and B–17e as published by Am. Soc. of Mech. Engineers.

American Society of Mechanical Engineers under procedure of American Standards Assn. B 17b–1925. Square and Flat Stock Keys, Standard Widths and Heights. Tables of dimensions and tolerances of keys for various shaft diameters.

American Society of Mechanical Engineers under procedure of American Standards Assn. B 17d–1927. Plain Taper Stock Keys, Square and Flat. Table of dimensions and tolerances for standard keys for various shaft sizes.

American Society of Mechanical Engineers under procedure of American Standards Assn. B 17e–1927. Gib Head Taper Stock Keys, Square and Flat. Table of dimensions and tolerances for standard keys for various shaft sizes.

American Society of Mechanical Engineers. Woodruff Keys, Keyslots and Cutters. Approved by American Standards Assn. as B 17f–1930. Dimensions and tolerances for standard Woodruff keys, keyslots, and cutters, standard key numbers.

Society of Automotive Engineers. 1931 Handbook. Key-Slot and Keyway Details; 1929. For Woodruff keys, general information on detail dimensions of key slots, keys above shaft and keyways for various sizes of shafts for 27 key sizes.

Society of Automotive Engineers. 1931 Handbook. Woodruff Keys; 1929. Dimensions of standard Woodruff keys from 1/16 by ½ to ⅜ by 1½-inch sizes. Dimensions of standard key slots and keyways.

References.—Methods of testing general requirements for metals. *See also* 600.1. Shafts. *See also* 611.52. Cotter keys. *See* 608.51.

608.6 Washers

American Electric Railway Engr. Assn. Recommended Specification. D102–29; 1929. Overhead Line Material for Direct and Catenary Suspension. Includes commercial steel washers, round and square types for bolts and rods, requirements on dimensions for sizes ⅜ to 1 inch.

National Electric Light Assn. Suggested Specifications. D270–28T; 1928. Tentative. Round Washer. Dimensions and allowable variations for steel washers for ⅜-inch to ¾-inch machine bolt, material according to N. E. L. A. specifications D200–22, galvanizing according to D210–22. Included in Publ. No. 289–45 of N. E. L. A.

National Electric Light Assn. Suggested Specifications. D275–24T; 1924. Tentative. Square Washer. D276–24T; 1924. Tentative. Anchor Rod Washer. Dimensions and allowable variations for steel washers ⅜ to 1-inch sizes, material according to N. E. L. A. specifications D200–22, galvanizing according to D210–22. Published in 1924 N. E. L. A. proceedings.

Society of Automotive Engineers. 1931 Handbook. Flat Washers, Aeronautic; 1928. Dimensions of two sizes of washers for each bolt size from No. 8 to ⅝.

Society of Automotive Engineers. 1931 Handbook. Lock Washers; 1922. Dimensions of machine screw and of bolt lock washers of standard, special light, and special heavy grades.

Society of Automotive Engineers. 1931 Handbook. Plain Washers; 1923. Dimensions of washers for bolt screw sizes up to 1½ inch.

References.—Lock washers and nuts for ball bearings. *See* 766.2.

608.7 TURNBUCKLES

American Marine Standards Committee. H. No. 6–1928. Rigging Screws with Spliced Rope. Dimensioned drawings of turnbuckles for various loadings, dimensions and threading of 12 standard sizes, strength requirements of the steel.

American Marine Standards Committee. H. No. 7–1928. Rigging Screws with Sockets. Dimensioned drawings for turnbuckles for various loads, dimensions and threading of 12 standard sizes, strength requirements for the steel.

Society of Automotive Engineers. 1931 Handbook. Turnbuckles, Aeronautic; 1928. Dimensions, tensile strength requirements for short and long turnbuckles, with brass barrels and various combinations of cable-eye and pin-eye connections, dimensions, strength and bend test requirements for cable-eyes, pin-eyes, and forks.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R71–28; 1928. Turnbuckles. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes of turnbuckles with and without stubs and of turnbuckles with hook, eye, and jaw ends.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Noncorrosive coatings. *See also* 600.3. Standard threads. *See also* 608.0.

610–619 IRON AND STEEL MANUFACTURES

611. CASTINGS AND FORGINGS

611.0 GENERAL ITEMS

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Cast iron. Samples No. 4d, No. 5f, No. 6d, No. 7b, and No. 74 for various cast irons, No. 55 for ingot iron, and No. 82 for nickel-chromium cast iron, prepared and sold by the bureau with a certificate giving the analysis, for use by industrial organizations and others as a comparison standard for checking the accuracy of analysis of cast irons, etc., the average analysis of each sample is given in supplement to C 25.

611.1 GRAY IRON CASTINGS

611.11 Gray Cast Iron

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Iron castings for machinery and boilers. Requirements on general quality, tension test, and transverse test.

American Electric Railway Engr. Assn. Recommended Specification. W104–28; 1928. Approved as tentative standard by American Standards

Assn. Serial E10–1929. Specification for Materials for Use in the Manufacture of Special Trackwork. Includes gray iron castings, both general and high test grades. Chemical composition requirements, for the high test grade. tension test requirements. General class of castings for switches, fillers, braces, and appurtenances, high test class of castings for high strength parts subject to wheel shock and not readily machinable.

American Railway Assn. Signal Section 1630; 1930. Gray Iron Castings. General quality requirements, chemical composition and transverse test requirements for light, medium, and heavy castings.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Buildings for Railway Purposes. Includes cast iron specification. Agrees with A48–29 of American Society for Testing Materials.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Steel Railway Bridges; 1924. Cast Iron. Requirements on chemical composition, classification into 3 weight classes, transverse test requirements for each class.

American Society for Testing Materials. A 48–29; 1929. Gray Iron Castings. For light, medium, and heavy castings, chemical composition, transverse and tension test requirements using A. S. T. M. standard test methods and test bars. 1918 edition available in Spanish and French from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 64–27; 1927. Standard Methods of Sampling and Chemical Analysis of Pig and Cast Iron. Sampling and treatment of samples from pig and casting, permissible variations in chemical analyses from different sources, determination of total carbon, of manganese, phosphorus, sulphur, silicon, small amounts of chromium, nickel, copper, titanium, arsenic.

American Society for Testing Materials. A 88–31; 1931. High Test Gray Iron Castings. For high strength castings including those known as semisteel castings. Tension tests made only when specified, general quality, transverse and tension test requirements, using A. S. T. M. standard test bar and methods of test.

American Society for Testing Materials. A 124–29; 1929. The Arbitration Test Bar and Tension Test Specimen for Cast Iron. Form and dimensions of pattern and mold for casting test bar intended for transverse testing and dimensions of tension test bar machined from a portion of arbitration test bar, correction factors for transverse test bars of diameter differing from standard.

American Society for Testing Materials. A 126–30; 1930. Gray Iron Castings for Valves, Flanges, and Pipe Fittings. Covers regular gray iron castings and higher strength gray iron including semisteels, chemical composition, tension, and transverse test requirements.

U. S. Gov., Federal Specifications Board. 140; 1924. High Test Gray Iron Castings (Semisteel). Light, medium, and heavy castings. General quality requirements, chemical composition, transverse test, and tension test requirements.

U. S. Gov., Federal Specifications Board. 141; 1924. Gray Iron Castings. For light, medium, and heavy castings. chemical composition, transverse test, and tension test requirements.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Standard samples. *See* 611.0. Other specifications for cast iron. *See* specifications of individual commodities made of cast iron.

611.12 Manhole and Conduit Castings

American Railway Assn. Telegraph and Telephone Section. 1–C–1; 1927. Communication Underground Conduit Construction. Includes manhole frames and covers of cast iron, dimensions of 2 types of manhole frames and covers and one type of inside cover. Includes also cast-iron caps for connecting U guards to pipe bends, dimensions.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Manhole for Main Sewer. Dimensions and weight of two weights of cast-iron curb and solid cover, requirements for quality of brick, mixture of mortar and of concrete, size and quality of aggregate, construction requirements of manholes as illustrated.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Standard samples. *See* 611.0. Other specifications for cast iron. *See* 611.11. Masonry sewers. *See* 518.67.

611.13 Sluice Gates and Mooring Bitts

American Marine Standards Committee. H No. 2–1925. Mooring Bitts, Cast-Iron. Dimensions of 12 standard sizes, standard arrangements of fastenings, material in conformity with Am. Bureau of Shipping specifications for gray cast iron.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Standard samples of cast iron. *See* 611.0. Specifications for gray cast iron. *See also* 611.11. Cast steel mooring bit. *See* 611.49. Cleats, cast-iron, for docks. *See* 611.49. Bollards, for docks. *See* 611.49.

611.14 Floor Drains and Traps

American Marine Standards Committee. H No. 36–1928. Deck Drain, Plain Type. Dimensioned drawing for cast iron or composition drains, dimensions of 4 standard sizes for steel decks and for covered decks.

American Marine Standards Committee. H No. 37–1928. Deck Drain, Trap Type. Dimensional drawing of cast-iron or composition drain, dimensions of standard drain for steel decks, one standard drain for covered decks less than 3⅝ inches thick, and one for decks over 3⅝ inches thick.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Area Cesspool. Heavy cast iron area drain with hinged perforated cover plate, without bell trap, dimensions, illustrated.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Combined Drain and Trap. Heavy pattern cast-iron type with brass strainer, dimensions and finish, depth of water seal.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Running Trap. For installation in manholes, provision and dimensions of fresh air inlet and clean-out plug, as illustrated, trap of cast iron.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Standard samples of cast iron. *See* 611.0. Plumbing practice and fixtures. *See also* 600.6, 617.7. Specifications for gray cast iron. *See also* 611.11. Brass traps and drains. *See* 645.4.

611.15 Grates and Grate Bars

References.—House heating boilers. *See* 614.4. Power boilers and accessories. *See* 703. Locomotives and parts. *See* 701.3, 702.9.

611.16 Pulleys

American Petroleum Institute. Poster No. 4; 1928. Recommended Practice. Standard Groove Form for Wire Rope and Manila Cordage. Dimensions, design formulas.

American Petroleum Institute. Standard No. 7–A; 1931. Miscellaneous Rotary Standards. Recommended Practice on Methods of Measurements, Etc. Includes standard methods of measurement of sheaves and hoisting blocks.

American Railway Assn. Mechanical Div. Recommended Practice. Car Lighting; 1927. Includes flanged pulleys for axle generators, recommended dimensions and design for 4 sizes up to 10-inch diameter.

National Machine Tool Builders Assn. T–1; 1927. Driving Speeds. List of 8 recommended standard pulley diameters for machine tool drive.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Standard samples of cast iron. *See* 611.0. Specifications for gray cast iron. *See also* 611.11. Paper pulleys. *See* 493. Sash pulleys. *See* 617.5. Awning pulleys, clothes line pulleys, etc. *See* 617.9.

611.17 Heating and Cooking Vessels

References.—House heating boilers. *See* 614.4 Stoves. *See* 614. Power boilers. *See* 703.1. Electric heating and cooking devices. *See* 717.1.

611.18 Cast-Iron Wheels

American Electric Railway Engr. Assn. E 13–26; 1926. Standard Design for Tread and Flange of Wheel. Dimensional drawings of tread and flange contours for steel and chilled iron wheels.

American Railway Assn. Mechanical Div. Wheel Tread and Flange for Cast-Iron Wheels; 1930. Approximate dimensions of tread and flange contour, dimensions should not be used in layout of contour.

American Railway Assn. Mechanical Division. Recommended Practice; 1928. Wheels, Cast Iron, for Locomotives, Tenders and Cars. For 33-inch wheels, requirements as to fracture, chill, chemical composition, dimensions, weights, drop test, chill test, and thermal test requirements, foundry practice requirements.

American Railway Assn. Mechanical Div. Recommended Practice. Maximum Flange Thickness Gage for Cast-Iron Wheels; 1930. Dimensions and design.

American Railway Assn. Mechanical Div. Recommended Practice. Wheels, Mounting; 1926. Table of standard mounting pressures for cast-iron wheels and for steel wheels for various wheel seat diameters, mounting details and procedure.

American Railway Assn. Mechanical Div. Wheel Flange Thickness Gages for Cast-Iron Wheels, Height and Throat Radius Gages for Solid Steel and Steel Tired Wheels; 1930. Dimensions and design.

American Railway Assn. Mechanical Div. Wheel Mounting and Check Gage for Cast-Iron Wheels; 1931. Dimensions and design.

American Railway Assn. Mechanical Div. Wheel Circumference Measure for Cast-Iron, Cast Steel, Wrought Steel and Steel Tired Wheels; 1919. Dimensions and graduation of tape measure and method of use.

American Railway Assn. Mechanical Div. Recommended Practice. Wheels, Cast-Iron, 33-inch Diameter; 1928. Detail dimensions and tread contour for 3 standard sizes for cars of weight 136,000 to 210,000 pounds, corresponding weights of wheels and sizes of axles.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Economics of Railway Labor. Standardization of Parts and Accessories for Railway Maintenance Motor Cars; 1929. For 1½-inch axle assembly, requirements on dimensions of axle and boring of wheels for both tight and insulated wheels, dimensions of wheel tread and flange for 16-inch and 20-inch wheels.

American Society for Testing Materials. A 46–24; 1924. Chilled Cast-Iron Wheels. Requirements on chemical composition, permissible variations from specified dimensions, weights of A. R. A. standard wheels.

American Society for Testing Materials. Tentative Specifications. A 46–30T; 1930. Chilled Tread Cast-Iron Wheels. General quality, chemical composition, thermal test, drop test, and chill test requirements, permissible variations from specified dimensions, weights of A. R. A. standard wheels.

Assn. of Manufacturers of Chilled Car Wheels. Chilled Tread Wheels for Locomotives, Tenders and Cars; 1930. For standard railway uses and for industrial uses, depth of chill, chemical composition, dimensions and tolerances, weight, and design requirements, maximum load on wheel.

Assn. of Manufacturers of Chilled Car Wheels. Foundry Standard, Inspection and Tests for Chilled Tread Wheels; 1930. Sampling, heating of ladles, pouring time, shaking out time, pit requirements and rate of cooling, construction of drop test apparatus, drop test and A. R. A. thermal test requirements, depth of chill requirements.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 116–201. Mining Locomotives. Includes requirements on dimensions of standard contour of locomotive wheels.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Classification of railway materials. *See* 600.2. Standard samples of cast iron. *See* 611.0. Steel railway car wheels and tires. *See* 611.49, 611.53. Wheel sizes for travelling cranes. *See* 744.1. Specifications for cast iron. *See also* 611.11.

611.19 Miscellaneous Manufactures of Gray Cast Iron

American Marine Standards Committee. E No. 23–1928. Built-up Propellers. For cast-iron or cast-steel hubs and cast-steel or cast-bronze blades, general quality requirements, materials according to American Bureau of Shipping, hammer test for blades, machining requirements for propeller parts, assembly and balance requirements.

American Marine Standards Committee. E. No. 25–1928. Propellers Cast in One Piece. For cast-iron propellers, materials according to American Bureau of Shipping specifications, general quality requirements, hammer test and machining requirements, recommendations on degree of balance.

American Railway Assn. Mechanical Div. Recommended Practice; 1924. Welding Wire and Rods. Includes cast-iron rods for gas welding of gray cast iron, requirements on chemical composition, dimensions and tolerances.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Railway Buildings, sec. 12–B. Ornamental and Misc. Metal Work. Ornamental castings. Requirements on type of molding sand, maximum thickness of metal, general quality and finishing, permissible stresses, to be cast from plaster reproduction of clay model. Cast iron to comply with A. S. T. M. Spec. A–48.

National Board of Fire Underwriters. Building Code; 1931. Cast Iron Columns and Column Bases. Permissible minimum diameter or side of column, minimum thickness of metal for column or base.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Floor, Wall, and Ceiling Plates. Minimum thickness and type of set screw for cast brass or cast iron or steel plates for uncovered pipes passing through partitions.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Roof Drains. Cast-iron cup type, requirements as to integral flange or attached flashing flange as regards dimensions and material, design of outlet and strainer, construction of expansion joint where such is specified.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Standard samples of cast iron. *See* 611.0. Cast iron bath tubs, lavatories and sinks. *See* 612.21, 612.23. C. I. boilers, radiators, water heaters. *See* 614.4. C. I. fittings for plumbing fixtures. *See also* 617.73. C. I. door locks, bolts, catches, fasteners, etc. *See* 617. C. I. pipe and fittings. *See* 607.1. C. I. valves and hydrants. *See* 607.6. C. I. ship chocks or rope guides. *See* 725.41. C. I. lifting jacks. *See* 616.91. C. I. water meters. *See* 793.4. C. I. journal bearings. *See* 692.3. Gray cast iron. *See also* 611.11. C. I. journal boxes. *See* 611.22. C. I. brake shoes. *See* 611.43. C. I. sash weights. *See* 617.5. C. I. locomotive cylinders. *See* 702.1. C. I. fuel tanks for engines. *See* 956.2. C. I. fire hose fittings. *See* 974.2. C. I. fire hose racks. *See* 974.3. Malleable cast iron. *See* 611.2. C. I. Washers. *See* 608.6. C. I. evaporators, feed water heaters, separators. *See* 703.9. Ship propeller hubs, studs, and fair-water caps. *See* 725.42. Water filters. *See* 619.5.

611.2 MALLEABLE IRON CASTINGS

611.21 Malleable Cast Iron

American Electric Railway Engr. Assn. Recommended Specification. W104–28; 1928. Approved as tentative standard by American Standards Assn. Serial E10–1929. Specification for Materials for Use in the Manufacture of Special Trackwork. Includes malleable iron castings. Manufacture according to A. S. T. M. specifications for malleable castings, heat treatment, tension test requirements when specified.

American Railway Assn. Mechanical Division. Recommended Practice; 1928. Malleable Iron Castings. Tension and annealing test requirements.

American Railway Assn. Signal Section. 1730; 1930. Malleable Iron Castings. Castings for railway signaling, clean and reasonably free from flaws, tension test requirements.

American Society for Testing Materials. A 47–30; 1930. Malleable Castings. Cover castings for railroad, motor vehicle, agricultural implement, and general machinery purposes. Tension test requirements.

Malleable Iron Research Institute. Malleable Castings; 1929. Castings for railroad use identical with specifications for malleable iron castings adopted by American Railway Assn. in 1929. Requirements on tensile strength, yield point, elongation, destruction test, annealing test, dimensions and casting of test specimen.

Malleable Iron Research Institute. Malleable Castings; 1924. Specifications for malleable castings for all work other than railroad work are identical with specifications A 47–24 of American Society of Testing Materials.

National Electric Light Assn. Suggested Specifications. D400–22; 1922. Malleable Castings (Material). Specifications conform to American Society for Testing Materials specifications A47–19, requirements on tensile strength and elongation. Published in 1924 N. E. L. A. proceedings.

Society of Automotive Engineers. 1931 Handbook. Malleable Iron Castings; 1922. For general automotive purposes, tension test requirements. Practically conforms to A. S. T. M. Spec. A47–19.

U. S. Gov., Federal Specifications Board. 378a; 1928. Iron, Malleable, Castings. For 1 grade of galvanized or ungalvanized casting, general quality and annealing requirements, tension test and impact test requirements.

References.—Methods of testing, general requirements for metals. *See* 600.1. Zinc coatings and tests. *See also* 600.3. Other specifications for malleable cast iron. *See* specifications for the individual commodities made of malleable cast iron.

611.22 Journal Boxes

American Electric Railway Engineering Assn. E2–30; 1930. Journal Boxes and Contained Parts. Standard designs and dimensions for journal boxes, bearings, wedges, and dust guards for 6 sizes of bearings.

American Railway Assn. Mechanical Div. Recommended Practice. Driving Boxes and Engine Truck Boxes; 1928. Recommended dimensions and design of cast steel boxes for various sizes of journals.

American Railway Assn. Mechanical Div. Dust Guards; 1930. For excluding dust from journal boxes and to retain oil, requirements on clearance from axle, noncutting material in contact with axle, method of closing, service life, for wood guards a 3-ply construction specified, thickness and tolerance.

American Railway Assn. Mechanical Div. Dust Guards for Journal Boxes A, B, C, D, E, and F.; 1920 and 1921. Standard dimensions of guards for 6 journal sizes.

American Railway Assn. Mechanical Div. Journal Boxes A, B, C, D, E, and F.; 1930. Dimensions and design of standard journal boxes for 6 sizes of journals, material cast iron, malleable iron, pressed steel, or cast steel, for freight and for passenger cars.

American Railway Assn. Mechanical Div. Journal Boxes Gages for Journal Boxes, classes C. D. E and F,; 1923. Dimensions and design for inside gage, bolt hole gage, dust guard opening gage, bolt hole hinge lug gage.

American Railway Assn. Mechanical Div. Journal Bearing Wedges; 1930. Of malleable iron, forged or cast steel, dimensions and design of 6 standard sizes.

American Railway Assn. Mechanical Div. Journal Box Lids; 1929. For malleable iron, cast steel, or pressed steel lids, requirements on thickness of material, construction, hinging, method of operation, and tightness of closure requirements.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Malleable cast iron. *See also* 611.21. Bearings and bearing metals. *See* 692. Classification of railway materials. *See* 600.2.

611.23 Rowlocks

611.29 Miscellaneous Manufactures of Malleable Cast Iron

American Electric Railway Engr. Assn. Recommended Specification. D102–29; 1929. Overhead Line Material for Direct and Catenary Suspension. Includes malleable iron fittings for trolley wire support brackets, trolley ears, feeder and messenger insulator pins, trolley crossings, frogs, and suspensions, and guy clamps. Requirements on construction, dimensions and permissible variations, malleable castings according to A. S. T. M. Spec. A–47.

References.—Malleable cast iron. *See also* 611.21. Methods of testing, general requirements for metals. *See also* 600.1. Classification of railway materials. *See* 600.2. Zinc coatings and tests. *See also* 600.3. Malleable iron pipe and fittings. *See* 607.2. M. I. brake beams and parts. *See* 611.42. M. I. stake pockets for flat cars. *See* 726.2. Trolley pull-overs and line suspensions of malleable iron. *See* 719.63. Pole brackets for trolley wire supports, of malleable iron. *See* 719.63. M. I. tie plates. *See* 606.2. M. I. driving point. *See* 719.62. M. I. hand drills. *See* 615.12. M. I. lifting jacks. *See* 616.91. M. I. spoke shaves. *See* 616.16. M. I. pipe cutters. *See* 615.39.

611.3 WROUGHT IRON FORGINGS

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Anchors. For forged wrought iron ordinary or stockless types, requirements on proof tests for various weights, numbers and sizes of anchors required for vessels of various tonnages.

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Iron forgings. Requirements on tension test and cold bend test.

American Bureau of Shipping Rules for Building and Classing Steel Vessels; 1930. Iron forgings for machinery. Requirements on tension test and bend test.

American Society for Testing Materials. A 73–30; 1930. Wrought-Iron Rolled or Forged Blooms and Forgings for Locomotives and Cars. For 2 grades of material, chemical composition and tests, tension and etch test requirements.

U. S. Gov., Federal Specifications Board. 474; 1927. Ladles, Plumbing. Double lip type of wrought iron or steel, general design, dimensions of 6 sizes.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Zinc coatings and tests. *See also* 600.3. Wrought-iron bars and rods. *See also* 603.1. W. I. plates. *See also* 604.14. W. I. chains. *See* 603.51, 603.52, 603.54. W. I. pipe and fittings. *See* 607.3. W. I. tie plates. *See* 606.2. W. I. stake pockets for flat cars. *See* 726.2. W. I. truck bolsters and coupler yokes for freight cars. *See* 611.49.

611.4 STEEL CASTINGS

611.40 General Items

American Railway Assn. Mechanical Div. Drop Test Machine for A. R. A. Couplers and Axles; 1911. Dimensions and design.

611.41 Cast Steel

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steel Castings. For open-hearth process type, requirements on tension test, cold bend test, drop test, and hammer test.

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steel castings for machinery and boilers. Requirements on annealing, tension test, and bend test, for 2 grades dependent on strength.

American Electric Railway Engr. Assn. Recommended Specification. W104–28; 1928. Approved by American Standards Assn. as tentatative standard E10–1929. Specification for Materials for Use in the Manufacture of Special Trackwork. Includes specifications for carbon steel track castings; for Class A castings not exposed to wheel wear, chemical composition requirements, for class B-hard, chemical composition, tension test and heat treatment requirements.

American Railway Assn. Mechanical Division. Recommended Practice; 1923. Steel Castings, Carbon. Grade A unannealed and annealed for special castings, grade B annealed for castings of high stress such as truck side frames, bolsters, couplers, locomotive frames and wheel centers, annealing requirements, chemical analysis, tension test requirements.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Steel Railway Bridges; 1924. Includes cast steel specifications, in agreement with A27–24 of American Society for Testing Materials except for minimum yield point for cast steel.

American Society of Mechanical Engineers. Boiler Construction Code. Section II. Specifications for Steel Castings; 1930. Chemical composition of annealed and unannealed castings, tension test requirements of annealed castings. Based substantially on A. S. T. M. specifications for steel castings, A 27–24 and specifications for carbon steel castings for railroads, A 87–27.

American Society for Testing Materials. A 27–24; 1924. Steel Castings. For general service and ships, covers class A in which no physical requirements are specified, and class B in which there are physical requirements and which is divided into hard, medium, and soft grades. Heat treatment procedure, chemical composition and tests, tension and bend test requirements, special requirements for ships including percussion tests for certain parts. Available in Spanish and Portuguese from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 87–27; 1927. Carbon Steel Castings for Railroads. For locomotive and car equipment and miscellaneous use, grade A annealed and unannealed, grade B for highly stressed truck side frames, bolsters, couplers, locomotive frames, of annealed steel castings. Chemical composition and tests, tension test requirements.

American Society for Testing Materials. A 95–29; 1929. Carbon Steel Castings for Valves, Flanges, and Fittings for High Temperature Service. Heat treatment, chemical composition, tension, bend, and hydrostatic pressure test requirements for materials to be used up to 750° F.

Society of Automotive Engineers. 1931 Handbook. Steel Castings; 1922. Chemical composition, tension test, and bend test requirements for hard, medium and soft grades of castings. Substantially the same as A. S. T. M. Specification No. A27–14.

U. S. Gov., Federal Specifications Board. 170; 1924. Steel Castings. Includes special, hard, medium, soft, and common grades. Preparation, repair, and annealing requirements for castings, chemical composition, tensile and bend test requirements for the 5 grades.

References.—Alloy steel castings. *See* 622.5. Methods of testing, general requirements for metals. *See also* 600.1. Classification of metals. *See* 600.2. Heat treatment of castings. *See also* 600.5. Zinc coatings and tests. *See also* 600.3. Test machine for castings. *See also* 611.40. Other specifications for cast steel. *See* specifications for individual commodities made of cast steel.

611.42 Railway Brake Beams

American Railway Assn. Mechanical Div. Brake Beam Gage; 1930. Dimensions and design for brake beam gage, brake head gage, brake shoe gage, angle gage for strut, channel caliper gage, channel opening gage for head and strut, lever pin hole gage, keyway gage, and limiting contour gage head.

American Railway Assn. Mechanical Div. Brake Beams, Limiting Outline for; 1920. Brake Beams, Complete; 1928. Dimensions and design of standard brake beam with tension rod of two sizes for two capacities of brake.

American Railway Assn. Mechanical Div. Brake Beams. Strut; 1908. Dimensions and design of malleable iron standard strut as regards cross section at various locations along strut.

American Railway Assn. Mechanical Div. Brake Beam Specifications and Tests; 1917. Steel and malleable iron to conform to A. R. A. specifications, tests requirements for proof test, set test, deflection test, using complete brake beam for test.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Classification of railway materials. *See* 600.2. Heat treatment of castings. *See also* 600.5. Testing machine. *See* 611.40. Cast steel. *See also* 611.41. Malleable cast iron. *See also* 611.21.

611.43 Railway Brake Shoes, Cast Steel and Cast Iron

American Electric Railway Engr. Assn. E1–27; 1927. Design of Brake Shoes, Brake Shoe Heads, Brake Shoe Keys and Gages. Dimensional drawings of brake shoes and parts and their gages for wheels of various diameters, tread widths and contours, including American Railway Assn. standard wheel contours.

American Railway Assn. Mechanical Division. Specifications for Brake Shoes; 1910. Requirements on coefficient of friction test and shoe wear test for both cast iron and steel tired wheels.

American Railway Assn. Mechanical Div. Recommended Practice. Brake Beams. Brake Shoe, Reinforced Back; 1922. Recommended dimensions and design of reinforced back for brake shoe.

American Railway Assn. Mechanical Div. Recommended Practice. Brake Beams. Brake Shoe, Reinforced; 1922. Recommended dimensions and design for reinforced brake shoe with 17-inch radius.

American Railway Assn. Mechanical Div. Brake Beams. Brake Shoe Key; 1922. Dimensions and design of standard wrought iron key.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Classification of railway materials. *See* 600.2. Standard samples of cast iron. *See* 611.0. Gray cast iron. *See also* 611.11.

611.44 Railway Couplers, Cast Steel and Forged Steel

American Electric Railway Engr. Assn. Recommended Specification. E100–29; 1929. Automatic Couplers for Interurban Cars and Radial Draft Rigging. For vertical plane type for coupling with standard steam railroad couplers, requirements on certain dimensions and operating features of couplers and draft rigging, details of guard arm and abutting wall, annealing, chemical composition, and tension test for cast steel.

American Railway Assn. Mechanical Division. Specifications for Purchase and Acceptance of A. R. A. Standard "D" Couplers, Knuckles, Locks and Other Parts; 1925. Covers cast steel for couplers and parts. Annealing, chemical analysis, tension test requirements, permissible variation in weight and gage, list of gages, drawings of standard "D" couplers and parts, and coupler limit gage.

American Railway Assn. Mechanical Div. Recommended Practice; 1930. Type E. Coupler. Dimensions and design of 5 by 7 inch shank, 6¼ by 8 inch shank, and shank details, design of coupler detail parts, dimensions of knuckle pivot pinhole.

American Railway Assn. Mechanical Division. Specifications for Coupler Knuckle Pivot Pins; 1928. Steel pins, chemical analysis, drop test requirements, permissible variation in dimensions.

American Railway Assn. Mechanical Div. Gages 1, 2, 3, 4 and 5 for Coupler and Yoke; 1909. Dimensions and design.

American Railway Assn. Mechanical Div. Coupler Limit Gage; 1918. Dimensions and design.

American Railway Assn. Mechanical Div. Standard "D" Coupler, 5 by 7 inch shank; 1916. Standard "D" Coupler, 6 by 8 inch Shank; 1926. Dimensions and design of standard couplers and coupler parts and of shank detail parts, detail of No. 10 contour.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Classification of railway materials. *See* 600.2. Heat treatment of castings. *See also* 600.5. Coupler yokes. *See also* 611.49. Testing machine for castings. *See also* 611.40. Cast steel. *See also* 611.41.

611.49 Miscellaneous Manufactures of Cast Steel

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Anchors. For cast steel anchors, of ordinary or stockless types, requirements on proof tests for various weights, duration of annealing, drop test, hammer test, and bend test, number and sizes required to equip vessels of various tonnages.

American Marine Standards Committee. E No. 23–1928. Built-Up Propellers. For cast-iron or cast-steel hubs and cast-steel or cast-bronze blades, general quality requirements, materials according to American Bureau of Shipping, hammer test for blades, machining requirements for propeller parts, assembly and balance requirements.

American Marine Standards Committee. E No. 25–1928. Propellers Cast in One Piece. For cast-steel propellers, materials according to American Bureau of Shipping specifications, general quality requirements, hammer test and machining requirements, recommendations on degree of balance.

American Marine Standards Committee. H No. 8–1926. Chain Plates. Dimensioned drawing for cast-steel chain plates, dimensions of 12 standard sizes, permissible working load, material in accordance with requirements of Am. Bureau of Shipping for steel castings.

American Marine Standards Committee. H No. 13–1926. Pad Eyes and Links. Dimensioned drawing for cast-steel pad and wrought-steel link, dimensions of 15 standard sizes, permissible working loads, materials in conformity with requirements of Am. Bureau of Shipping for steel castings and for chains.

American Marine Standards Committee. H No. 17–1926. Mooring Bitts, Cast-Steel. Dimensions and methods of fastening for 12 standard sizes, material to be in accordance with Am. Bureau of Shipping specifications for grade 1 steel casting.

American Marine Standards Committee. H No. 35–1928. 4-inch Weather Deck Scupper. Dimensional drawing, material cast iron or cast steel, galvanized, for 1 standard size and type.

American Marine Standards Committee. P No. 1–1931 to P No. 4–1931. Bollards and Cleats for Docks. Standard design and dimensions of 5 sizes of single bollards, cleats, and bollard cleats, and of 3 sizes of double bollards for both cast iron and cast steel construction, materials in accordance with specifications of Am. Soc. for Testing Materials.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. Coupler Yokes. Design test requirements for freight coupler yokes of horizontal or vertical plane types, material cast steel, structural steel, or forged iron or steel in accordance with A. R. A. specifications, requirements on minimum tension area, test requirements for maximum set and for breaking load.

American Railway Assn. Mechanical Div. Recommended Practice. Driving and Trailer Wheels for Locomotives. Recommended dimensions and design for 7 sizes of driving wheels and 4 sizes of trailer wheels of cast steel.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. Truck Bolsters. Design test requirements for freight bolsters with integral or separable center plate, of cast steel, structural steel, or forged iron or steel in accordance with A. R. A. specifications, maximum permissible stresses, test load requirements and permissible deflections.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. Truck Side Frames, Cast Steel. Design test requirements for freight truck side frames with integral or separable journal boxes, vertical test load and permissible deflection requirements for 4 sizes, material of Grade B of A. R. A. specifications.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Floor, Wall, and Ceiling Plates. Minimum thickness and type of set screw for cast brass or cast iron or steel plates for uncovered pipes passing through partitions.

References.—Alloy steel castings. *See* 622.5. Methods of testing, general requirements for metals. *See also* 600.1. Classification of railway materials. *See* 600.2. Zinc coatings and tests. *See also* 600.3. Heat treatments. *See also* 600.5. Cast steel stake pockets for flat cars. *See* 726.2. Cast steel chain. *See* 603.53. Cast steel pipe fittings. *See* 607.4. Cast steel valves. See 607.6. Cast steel journal boxes. *See* 611.22. Locomotive crossheads, cylinder heads, piston heads, of cast steel. *See* 702.9. Railroad frogs, crossings, switches, and special trackwork of cast steel. *See* 606.3. Cast steel fire hose racks. *See* 974.3. Cast steel ship chocks or rope guides. *See* 725.41. Cast steel lifting jacks. *See* 616.91. Cast steel. *See also* 611.41. Testing machine for castings. *See* 611.40. Wheel sizes for travelling cranes. *See* 744.1.

611.5 STEEL FORGINGS

611.50 General Items

American Railway Assn. Mechanical Div. Drop Test Machine for A. R. A. Couplers and Axles; 1911. Dimensions and design.

611.51 Forged Steel

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Ingot steel forgings, and welded steel forgings. Requirements on reduction in area in forging, annealing, and tension test.

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steel forgings for machinery. For 3 grades, No. 1 for all purposes, No. 2 for all purposes except propeller shafts, and No. 3 for all engine forgings, except main shafting, piston and connecting rods, requirements on reduction of area in forging, annealing, tension test, and bend test.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. Normalized and Tempered Carbon Steel Forgings. For carbon steel shafts, engine axles, crank pins, main, side, and piston rods, etc., requirements on total reduction from ingot, on heat treatment and cooling procedure, chemical composition, tension tests, micrographic and macroscopic test requirements.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Includes forged steel, chemical composition and tension test requirements for various sizes of annealed steel forgings.

American Society of Mechanical Engineers. Boiler Construction Code. Section II; 1930. Specifications for Seamless Steel Drum Forgings. Chemical analysis, annealing, tension and bend test requirements, permissible variation in dimensions.

American Society for Testing Materials. A 18–30; 1930. Carbon Steel and Alloy Steel Forgings. Covers class A for welding or case hardening, classes B and C for structural purposes, classes D to M for machinery. Annealing, quenching and tempering procedure, chemical composition and tests, tension test requirements. 1921 edition available in Spanish and Portuguese from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. Tentative Specifications. A 20–31T; 1931. Carbon Steel Forgings for Locomotives. Covers untreated and annealed carbon steel driving axles, engine, and trailing truck axles, side rods, crank pins, piston rods, and annealed car and tender axles. Heat treatment procedure, chemical composition and tests, tension test requirements. 1916 edition available in Spanish and the 1921 edition available in Portuguese from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

References.—Alloy steel forgings. *See* 622.6. Methods of testing, general requirements for metals. *See also* 600.1, 611.50. Classification of metals. *See* 600.2. Heat treatments. *See also* 600.5. Testing machine for forgings. *See also* 611.50. Other specifications for forged steel. *See* specifications of individual commodities made of forged steel.

611.52 Axles, Shafts, and Similar Forgings

American Electric Railway Engr. Assn. E3–30; 1930. Design of Axles for Electric Railway Motors. Detail dimensions and tolerances for 15 standard designs for capacities up to 57,000 pounds, wheel sizes 26 to 36, permissible eccentricity, wheel, gear, and axle stress data.

American Electric Railway Engr. Assn. E5–24; 1924. Standard Specification for Quenched and Tempered Carbon Steel Axles, Shafts and Similar Forgings. Heat treating, rough turning, chemical analysis, tensile and bend tests of open-hearth or electric furnace steel.

American Electric Railway Engr. Assn. E6–23; 1923. Standard Specification for Annealed Carbon Steel Axles, Shafts and Similar Forgings. Heat treating, turning, chemical analysis, tensile and bend tests of open-hearth or electric furnace steel.

American Petroleum Institute. Standard No. 6; 1930. Rig Iron Standards. For sand reel shafts and crank shafts, requirements on dimensions and tolerances for 3 standard sizes of each.

American Petroleum Institute. Standard No. 7–C; 1930. Dimensional Standards for Line Shafts for Rotary Drilling. Dimensions of standard shafts, bores of mating members, and associated keys and keyways, for 4, 5, and 6 inch sizes, the classes of fits and tolerances were selected from American Standards Assn. spec. B4–A, 1925.

American Railway Assn. Mechanical Division. Recommended Practice; 1926. Axles, Carbon Steel, for Cars and Locomotive Tenders. Covers tapered axles up to 6½-inch diameter. Chemical analysis, drop test requirements, weights.

American Railway Assn. Mechanical Division. Recommended Practice; 1926. Axles, Shafts, and Other Forgings, Carbon Steel, Annealed and Unannealed. Medium grade for large locomotive forgings as axles, etc., and mild grade. Chemical analysis and tension test requirements.

American Railway Assn. Mechanical Division. Axles, Shafts and Other Forgings, Carbon Steel, Quenched and Tempered; 1925. For locomotive construction. Boring, heat treatment, chemical analysis, test requirements for tension, bending, and impact.

American Railway Assn. Mechanical Div. Recommended Practice. Driving Axles for Locomotives. Engine Truck Axles and Trailing Truck Axles; 1927. Recommended dimensions and design of several standard sizes.

American Railway Assn. Mechanical Div. Recommended Practice; 1930. Journal Length Gage. Gage for measuring length of journals on class "A to F" axles.

American Railway Assn. Mechanical Div. Axles; 1928. Standard dimensions of 6 axle sizes, letter designation for each size with load it is designed to carry.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Economics of Railway Labor. Standardization of Parts and Accessories for Railway Maintenance Motor Cars; 1929. For 1½-inch axle assembly, requirements on dimensions of axle and boring of wheels for both tight and insulated wheels.

American Society of Mechanical Engineers under procedure of American Standards Assn. B 17a–1924. Cold-Finished Shafting, Standard Diameters and Lengths. Tables of dimensions and tolerances of transmission shafting and machinery shafting.

American Society of Mechanical Engineers under procedure of American Standards Assn. B 17c–1927. Code for Design for Transmission Shafting. Design formulas and diagrams for solid and hollow shafts subjected to torsion, flexure, and axial loading.

American Society for Testing Materials. A 19–27; 1927. Quenched and Tempered Carbon Steel Axles, Shafts, and Other Forgings for Locomotives and Cars. Heat treatment procedure, chemical composition and tests, tension, bend, and impact proof test requirements. Available in Spanish and Portuguese from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. Tentative Specifications A 20–31T; 1931. Carbon Steel Forgings for Locomotives. Covers untreated, annealed, and normalized and tempered axles, side rods, crank pins, and piston rods. General heat treating requirements, chemical composition, tension test requirements for various sizes and degree of heat treatment, bend test requirements where specified.

American Society for Testing Materials. A 21–27; 1927. Carbon Steel Car and Tender Axles. Covers tapered axles up to 6½ inches diameter. Chemical composition and tests, drop test requirements including the American Railway Assn. drop tests for five standard axles and drop test machine specifications, permissible variations in dimensions and weights. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 22–21; 1921. Cold-Rolled Steel Axles. Chemical composition and tests, tension and bend test requirements.

National Machine Tool Builders Assn. T–2; 1928. Simplified List of Shaft Diameters. Standard shaft diameters for machine tool construction from 1-inch size to 6-inch size.

References.—Alloy steel axles and shafts. *See also* 622.6. Methods of testing, general requirements for metals. *See also* 600.1, 611.50. Classification of railway materials. *See* 600.2. Heat treatments. *See also* 600.5. Testing machine. *See also* 611.50. Shafting for ships. *See* 725.42. Steel for shafts and axles. *See also* 603.24, 621.31. Steel forgings. *See also* 611.51.

611.53 Wheels and Tires, Steel

American Electric Railway Engr. Assn. E7–21; 1921. Standard Specification for Solid Wrought Carbon Steel Wheels for Electric Railway Service. Same as Am. Soc. for Testing Materials. Type of steel, chemical composition, and dimensional tolerances of wheel.

American Electric Railway Engr. Assn. E8–26; 1926. Standard Limit of Wear Gages for A. E. R. E. A. and A. R. A. Standard Flange Contours. Drawings showing dimensions of three gages.

American Electric Railway Engr. Assn. E9–19; 1919. Standard Plane Gage for Solid Steel Wheels. Drawing of gage for use in checking warp in wheel by placing it on back of rim.

American Electric Railway Engr. Assn. E10–25; 1925. Standard Wheel Mounting Gage. Dimensional drawing and details of gage for eight wheel contours.

American Electric Railway Engr. Assn. E11–19; 1919. Standard Rotundity Gage for Solid Steel Wheels. Drawing of gage for fitting center of tread of wheel.

American Electric Railway Engr. Assn. E13–26; 1926. Standard Design for Tread and Flange of Wheel. Dimensional drawings of tread and flange contours for steel and chilled iron wheels.

American Electric Railway Engr. Assn. E14–29; 1929. Standard Dimensions of A. E. R. E. A. Steel Wheel Designs. Dimensions of parts of wheels 21 to 36 inches in diameter, various flange thicknesses, flange heights, etc.

American Electric Railway Engr. Assn. Recommended Design. E112–26; 1926. Wheel Checking Gage for A. E. R. E. A. Contours A, B, C, and D. Drawing of gage for checking wheels in service and not for mounting wheels.

American Electric Railway Engr. Assn. Recommended Design. E113–26; 1926. Wheel Mounting and Check Gage for A. R. A. Contours E and F. Drawing of gage. Same as gage adopted by Am. Railway Assn. except that a center point has been added.

American Railway Assn. Mechanical Div. Recommended Practice. Mounting Gage for Wrought Steel Wheels; 1927. Dimensions and design.

American Railway Assn. Mechanical Div. Tires, Master Gage for Boring; 1908. Dimensions for 13 sizes.

American Railway Assn. Mechanical Div. Wheel Centers, Master Gage for Turning; 1908. Dimensions for 13 sizes, 38 to 90 inches.

American Railway Assn. Mechanical Div. Wheel Circumference Measure for Cast-Iron, Cast-Steel, Wrought-Steel and Steel-Tired Wheels; 1919. Dimensions and graduation of tape measure and method of use.

American Railway Assn. Mechanical Div. Wheel Tread and Flange for Steel Tired Wheels on Cars and Tenders; 1930. Detail dimensions for one standard size.

American Railway Assn. Mechanical Div. Wheel Tread and Flange for Wrought Steel Wheels on Cars and Tenders; 1923. Detail dimensions for one standard size.

American Railway Assn. Mechanical Div. Wheels and Track, Terms and Gaging Points for; 1894. Definitions and standard dimensions for gage of track, inside gage of wheel flanges, gage of wheels, thickness of flange, width of tread, check gage distance, and over all gage.

American Railway Assn. Mechanical Div. Wheels Steel, Rotundity Gage for; 1917. Dimensions of ring gage for 33, 36, or 38 inch wheels.

American Railway Assn. Mechanical Div. Wheels, Wrought Steel, Plane Gage for; 1917. Dimensions and design of 3 sizes.

American Railway Assn. Mechanical Div. Recommended Practice. Wheels, Mounting; 1926. Table of standard mounting pressures for cast iron wheels and for steel wheels for various wheel seat diameters, mounting details and procedure.

American Railway Assn. Mechanical Div. Recommended Practice. Wheels, Steel Tired, Tire Fastenings for; 1930. Dimensions and design of recommended tire fastening means, bolted type.

American Railway Assn. Mechanical Div. Wheels, Wrought Steel, 36-inch Diameter; 1923. Detail dimensions and design of 2 standard sizes for use with 4 axle sizes.

American Railway Assn. Mechanical Div. Wheels, Wrought Steel, 33-inches Diameter; 1923. Detail dimensions and design for 2 sizes for use with 4 axle sizes.

American Railway Assn. Mechanical Div. Section of Tire; 1930. Detail dimensions of standard tire sections for steel tired engine and tender truck wheels and flanged driving tires in switching service, for flanged driving and trailing wheel of locomotives in road service, and for plain tires.

American Railway Assn. Mechanical Div. Tires, Shrinkage Allowances for; 1907. Standard shrinkage allowances for tires for cast iron and cast steel wheels.

American Railway Assn. Mechanical Div. Tires, Steel, Minimum Thickness for; 1923. Minimum thicknesses for tires using 5 different methods of attachment to wheels.

American Railway Assn. Mechanical Division. Wheels, Solid Wrought Carbon Steel; 1926. Chemical analysis, mating, dimensions and tolerances, list of standard gages required.

American Railway Assn. Mechanical Division. Recommended Practice; 1920. Tires, Steel for Locomotives and Cars. Three classes according to carbon content, chemical analysis, tension test requirements, mating, permissible variations in dimensions.

American Society for Testing Materials. A 25–24; 1924. Wrought Solid Carbon Steel Wheels for Electric Railway Service. Chemical composition and tests, permissible variations in dimensions.

American Society for Testing Materials. A 26–16; 1916. Steel Tires. Covers three classes, for driving tires for passenger locomotives, driving tires for freight locomotives and tires for car wheels and miscellaneous service, driving tires for switching locomotives. Chemical composition and tests, tension test requirements, permissible variations in dimensions. Available in French from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 57–29; 1929. Wrought Solid Carbon Steel Wheels for Steam Railway Service. Chemical composition test requirements, permissible variations from specified dimensions. 1924 edition available in Spanish and Portuguese from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

Assn. of Iron and Steel Electrical Engineers. Electric Overhead Traveling Cranes, Heavy-Duty Steel Mill Service. Includes rolled or forged steel wheels for bridge track and trolley track, standard tread diameters and standard bores.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 116–201. Mining Locomotives. Includes requirements on dimensions of standard contour of locomotive wheels.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 611.50. Classification of railway materials. *See* 600.2. Heat treatments. *See also* 600.5. Testing machine for forgings. *See also* 611.50. Cast iron wheels. *See also* 611.18. Cast steel wheels. *See also* 611.49. Steel forgings. *See also* 611.51.

611.54 Springs, Helical and Elliptical, and Parts

American Railway Assn. Mechanical Division. Recommended Practice; 1917. Springs, Elliptical. Carbon steel chemical composition, permanent set test requirements as measured by the compression method and by the release method, table of test loads to correspond to maximum allowable fiber stress.

American Railway Assn. Mechanical Div. Springs, Helical; 1930. Chemical composition requirements in conformity with A. R. A. specifications for carbon steel bars for railway springs, permissible variations in solid height, free height, and loaded height from amount specified, permanent set test requirements, permissible test loads.

American Railway Assn. Mechanical Div. Springs and Spring Caps for Freight Car Trucks; 1915 and 1924. For 8 sizes of springs and spring clusters, standard dimensions of caps and of springs, free and loaded heights of springs and of spring clusters, load capacities.

American Railway Assn. Mechanical Div. Tentative Standard. Springs and Spring Caps for Freight Cars, Classes L, M, N, O, and P; 1924. Dimensions and design of spring caps, dimensions of springs, free and loaded height of springs and of various spring groupings, load capacities.

American Society for Testing Materials. A 61–16; 1916. Helical Steel Springs for Railways. Chemical analysis, test requirements for solid, free, and loaded heights, and for permanent set, table of test loads for helical springs for given fiber stress.

American Society for Testing Materials. A 62–16; 1916. Elliptical Steel Springs for Railways. Chemical analysis, compression test requirements for free height, loaded height and length, and permanent set, test requirements by release method.

American Society for Testing Materials. Tentative Specifications. A 125–31T; 1931. Heat Treated Carbon Steel Helical Springs. Covers hot coiled compression springs of round bars for railroad use. General construction and heat treatment requirements, chemical composition requirements, tolerances from specified values for diameter, solid height, free height, loaded height; uniformity of pitch, and permanent set requirements.

Society of Automotive Engineers. 1931. Handbook. Recommended Practice. Leaf Springs; 1929. Tolerances on diameter of spring eyes and bushings, on width and thickness of bars, and allowable variations in the required concavity of bars, test requirements of spring eyes.

Society of Automotive Engineers. 1931. Handbook. Spring Center Bolts; 1931. Standard dimensions and type of thread for center bolts for springs for passenger automobiles and motor trucks.

Society of Automotive Engineers. 1931. Handbook. Recommended Practice. Spring Rebound Clips, Spacers and Bolts; 1931. Standard dimensions of spring parts for spring widths up to 3½-inches for passenger automobiles and motor trucks.

References.—Alloy steel springs. *See* 622.7. Methods of testing, general requirements for metals. *See also* 600.1, 611.50. Classification of railway materials. *See* 600.2. Heat treatments. *See also* 600.5. Steel for springs. *See also* 603.33, 621.34. Bed springs. *See* 613.1.

611.55 Pinions and Gears

American Electric Railway Engr. Assn. E15–24; 1924. Standard Web Holes for Railway Gears. Tables of hole diameters and center distances for various diameters and widths of gears.

American Electric Railway Engr. Assn. Recommended Specification. E117–29; 1929. Case Hardened Forged Steel and Quenched and Tempered Forged Carbon Steel Gears. Requirements on chemical composition, hardness and depth of case hardening for case hardened pinions, dimensions and tolerances, tooth data and dimensions for long and short addendum spur and helical gearing, diametrical pitch 2 to 4¼.

American Electric Railway Engr. Assn. Recommended Specification. E118–29; 1929. Case Hardened Forged Steel and Quenched and Tempered Forged Carbon Steel Pinions. Requirements on chemical composition, hardness and depth of case hardening for case hardened pinions, dimensions and tolerances, tooth data and dimensions for long and short addendum spur and helical gearing, diametrical pitch 2 to 4¼.

American Society of Mechanical Engineers. Joint sponsor with American Gear Mfrs. Assn. under procedure of American Standards Assn. B 6b–

1927. Spur Gear Tooth Form. 14½ degree Composite System and 20° Stub Involute System. Diagrams of tooth forms and formulas for dimensions.

Society of Automotive Engineers. 1931 Handbook. Recommended Practice. Starting Motor Pinions; 1929. Number of teeth, pressure angle, and pitch specified for standard pinion and also for heavy duty starting motor pinions.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 611.50. Heat treatments. *See also* 600.5. Steel for gears. *See also* 603.22, 621.31. Pinions and side gears for automobile differentials. *See aso* 722.34. Steel forgings. *See also* 611.51.

611.56 Turbine Bucket Wheels

611.59 Miscellaneous Manufactures of Steel Forgings

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Anchors. For forged steel anchors of ordinary or stockless types, requirements on proof tests for various weights, number and sizes required to equip ships of various tonnages.

American Electric Railway Engr. Assn. Recommended Specification. W104–28; 1928. Approved by American Standards Assn. as tentative standard E10–1929. Specification for Materials for Use in the Manufacture of Special Trackwork. Includes mild carbon steel forgings for parts not exposed to wheel wear and hard steel forgings for parts subject to wheel wear. Chemical composition and tension test requirements.

American Railway Assn. Mechanical Div. Recommended Practice. Draft Gear Followers; 1930. Where separate followers are used with friction draft gear, steel to meet physical and chemical requirements of A. R. A. specifications for axles, shafts, and other forgings, requirements on dimensions and tolerances, method of cutting.

References.—Alloy steel forgings. *See* 622.6. Methods of testing, general requirements for metals. *See also* 600.1, 611.50. Heat Treatments. *See also* 600.5. Steel for axles and shafts. *See also* 603.24. Spring and tool steel. *See also* 603.3. Alloy steel for forgings. *See also* 621.31, 621.34, 621.35. Hand tools. forged. *See* 615, 616. Builders' hardware, forged. *See* 617. Forged pipe flanges. *See* 607.4. Ship couplings, forged. *See* 725.42. Tools for metal working machines. *See* 765. Automobile parts. *See* 722.3. Journal boxes and lids of pressed steel. *See* 611.22. Truck bolsters and coupler yokes of forged steel. *See* 611.49. Locomotive crosshead pins, side rod pins and knuckle joints, of forged steel. *See* 702.9. Bolts, nuts, screws, of forged steel. *See* 608.31, 608.32, 608.2. Forged clevis for insulator attachment. *See* 719.62. Insulator pin, drop forged. *See* 719.61. Scissors and shears, forged. *See* 612.13. Forged chain attachments. *See* 603 57.

612. CUTLERY, HOLLOW WARE, AND OTHER HOUSEHOLD UTENSILS

612.1 CUTLERY, EXCEPT TOOLS

612.11 Pocket Knives

U. S. Gov., Dept. of Commerce. Bureau of Standards R99–30; 1930. Pocketknives. Simplified practice recommended and accepted by industry limiting the number of sizes and shapes of handles for pocketknives and the maximum number of varieties any one manufacturer may produce, standard colors of celluloid given for celluloid-handled knives.

612.12 Razors

U. S. Gov., Dept. of Commerce. Bureau of Standards R69; 1928. Packaging of Razor Blades. Simplified practice recommended and accepted by industry establishing standard packaging for the various makes of razor blades, covering blades per package and packages per carton.

612.13 Scissors and Shears

U. S. Gov., Federal Specifications Board. 361a; 1929. Shears and Scissors, Office. Bankers type, double pointed; straight trimmer type, one point sharp and one point blunt; Grade 1, mild steel frames with carbon steel blades; Grade 2, solid forged steel. Finish, percentage of carbon in steel, construction, and cutting test requirements.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Metal cutting shears. *See* 615.33. Forged steel. *See also* 611.51.

612.14 Table and Kitchen Cutlery

612.2 HOLLOW AND STAMPED WARE, IRON AND STEEL

612.20 General Items

U. S. Gov., Dept. of Commerce. Bureau of Standards CS30–31; 1931. Colors for Colored Sanitary Ware. A commercial standard selected and accepted by industry establishing 6 standard colors for sanitary ware, standard samples being kept at the Bureau of Standards, requirements on procedure for making color comparisons with sample. Applicable to plumbing fixtures and allied products.

U. S. Gov., Dept. of Commerce. Bureau of Standards R55; 1926. Tinware, Galvanized, and Japanned Ware. Simplified practice recommended and accepted by industry establishing a limited list of standard stock items for stamped ware, as bowls, covers, cups, dippers, molds, pans, plates, etc., for metallic sieves, for pieced tinware boilers, buckets, kettles, pans, etc., for heavy tinware coffee boilers, cake cutters, dippers, etc., for japanned ware baths, cake boards, etc., for galvanized baths, buckets, cans, hods, pails, etc. Items are listed according to catalogue numbers of catalogue No. 35 of the National Enameling & Stamping Co. to which reference must be made for determining sizes, gages of metal, and trade capacities.

References.—Enamel for enamel ware. *See* 531.6.

612.21 Bath Tubs

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Bath Tubs. For one-piece cast-iron flat bottom pattern with legs; for one-piece cast iron tubs of recessed and corner types. General dimensions and construction, quality of enameling, sizes and types of supply and waste fittings.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Enameled Ironware. Requirements as to freedom from defects of cast ironware having a porcelain enamel coating fused on surface.

References.—Porcelain and vitreous ware bath tubs. *See* 532.23. Gray cast iron. *See also* 611.11. Standard sizes of japanned ware and of galvanized baths. *See also* 612.20. Standard colors for colored sanitary ware. *See* 612.20.

612.22 Hotel and Household Hollow and Stamped Ware

References.—Standard stock sizes. *See* 612.20.

612.23 Water-closets and Sinks

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Cast-Iron Lavatories. General dimensions and shape, quality of enameling, general construction, waste and supply accessories, for enameled iron pedestal supported type, and enameled iron wall supported type.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures. (For Land Use). Enameled Ironware. Requirements as to freedom from defects of cast ironware having a porcelain enamel coating fused on surface.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Kitchen Sinks. For one-piece cast-iron sinks with integral drain board, general dimensions and shape, quality of enameling, waste and supply accessories, for wall supported type and combined wall and floor supported type.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Slop Sink. For one-piece cast-iron sink supported on trap standard, general dimensions and construction of sink and trap, quality of enameling, dimensions of brass rim guard, supply accessories required.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Steel Scullery Sink. For two compartment sink of galvanized sheet steel, with and without drain boards, general dimensions and construction, types and sizes of supply and waste accessories.

References.—Porcelain and vitreous ware water-closets and sinks. *See* 532.23. Gray cast iron. *See also* 611.11. Zinc coatings and tests. *See also* 600.3. Galvanized steel sheets. *See also* 604.32. Standard colors for colored sanitary ware. *See* 612.20. Seats and hinges for water closet bowls. *See* 532.23.

612.29 Miscellaneous Hollow and Stamped Ware

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Dust Pan. Dimensions, metal gage, and design of pan with long bail type handle, of tin or cold rolled steel.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Marking Pot. Dimensions, metal gage, and design of marking pot with tubular handle, of tin or cold rolled steel.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. One Pint, One Quart, and One Gallon Funnels. Dimensions, metal gage, and design of conical shape funnels of tin or cold rolled steel.

References.—Standard sizes of tinware, galvanized ware, and japanned ware. *See* 612.20. Tin hollow ware. *See also* 681.41. Metal containers. *See* 951., 953.1, 954.21, 956. Liquid and dry measures of iron or steel. *See also* 919.1. Cans of steel. *See* 959.1.

612.3 MISCELLANEOUS HOUSEHOLD UTENSILS

References.—Tin hollow ware. *See* 681.41. Metal and wooden pails. *See* 951.64, 951.65. Metal and wooden tubs. *See* 951.71, 951.72. Jars. *See* 955.4. Brooms and brushes. *See* 981., 982. Motor driven household devices. *See* 717.2.

613. METAL FURNITURE AND FIXTURES

613.1 BEDS, BED SPRINGS, COTS

American Marine Standards Committee. H No. 53–1929. Shallow Berths for Ships. Dimensions of 2 standard lengths and 2 standard widths of shallow berths made of tubular steel with angle iron end rails, requirements on thickness of wall and size of upper and of lower tubular rails and size of angle iron rail, dimensions and design of corner fittings, etc.

American Marine Standards Committee. H No. 54–1929. Deep Berths for Ships. Dimensions of 1 standard length and 2 standard widths of deep berths, made of tubular steel with angle iron end rails, requirements on construction and assembly, size of tubing and angle iron, dimensions and construction of corner fittings, etc.

American Marine Standards Committee. H No. 55–1929. Bracket for Fixed Berths. H No. 56–1929. Bracket and Optional Retainer for Hinged Berths. H No. 57–1929. Chain Lug for Hinged Berths. H No. 58–1929. Hook for Hinged Berths. All of above are stanchion fittings for Am. Mar. standard berths, requirements on dimensions and design, castings of malleable iron.

American Marine Standards Committee. H No. 59–1929. Box Type Wall Support for ship berths. H No. 60–1929. Bracket Type Wall Support for Ship Berths. Requirements on dimensions and design, castings of malleable iron.

U. S. Gov., Dept. of Commerce. Bureau of Standards R2–30; 1930. Bedsteads, Springs, and Mattresses. For iron, steel, or brass beds, simplified practice recommended and accepted by industry establishing a limited list of standard sizes with width and length dimensions for straight foot and bow foot beds and coil spring and metal fabric bed springs.

U. S. Gov., Dept. of Commerce. Bureau of Standards R 24; 1924. Hospital Beds. Simplified practice recommended and accepted by industry establishing a limited list of standard bed sizes covering length, height to top of springs, and width.

U. S. Gov., Federal Specifications Board. 186a; 1927. Beds, Hospital. Standard dimensions, construction details for headpiece and foot piece of steel tubing, for corner lock, for wire fabric and fabric frame, mosquito bar rods, and wooden shoes or casters, illustrated.

U. S. Gov., Federal Specifications Board. 187a; 1928. Beds, Surgical. General dimensions of assembled bed, construction details and dimensions for headpiece of steel tubing, foot piece of steel tubing, corner lock, mechanically adjustable spring bottom with outer and inner frame of angle iron, mosquito bar rods, and wooden shoes or casters, illustrated.

U. S. Gov., Federal Specifications Board. 188; 1924. Folding Hospital Cot. Details of construction and dimensions for cot with ends of steel tubes, fabric frame of steel angles, wire fabric with helical end springs, iron or steel rod T canopy, cot ends to fold under and within frame, illustrative sketch.

U. S. Gov., Federal Specifications Board. 189; 1924. Adjustable Spring Bottom, Gatch Frame. Adjustable spring bottom for standard folding hospital cot. Details of construction, dimensions, and operating requirements for frame with outer part of steel angles, inner frame of steel tubing, handles, wire fabric, and supporting helical side springs, illustrated.

U. S. Gov., Federal Specifications Board. 190; 1924. Liberty Steel Cot. For cot made with ends of steel tubing and fabric frame of steel angles, details of construction and dimensions, wire sizes for double or single link fabric and helical end springs, fabric frame locking device requirements, illustrative sketch, ends fold under and within frame.

References.—Steel tubular goods. *See also* 607.4. Malleable cast iron. *See also* 611.21. Wooden beds and cots. *See* 431.11, 431.13.

613.2 BOOK CASES

U. S. Gov., Federal Specifications Board. AA–F–791; 1930. Sectional Steel Office Furniture and Cabinets. Includes bookcase sections with disappearing glass panel doors, requirements on dimensions, chemical composition of bronze hardware, thickness of metal for various parts, construction details including spot welding.

References.—Iron and steel sheets. *See also* 604.0. 604.22, 604.23.

613.3 CHAIRS AND STOOLS

References.—Wooden chairs and stools. *See* 435.2, 438.

613.4 DESKS

U. S. Gov., Federal Specifications Board. AA–D–191; 1931. Desks, Steel. Flat top, single and double pedestal desks; flat top, double desks; typewriter desks, drop center, single and double pedestal, flat top; typewriter desks, double pedestal, pedestal device, flat top; roll top, double pedestal desks. Knock down construction of sheet steel material, pretreatment and final finish of material, construction requirements and material gages for drawers, tops, shelves, legs, panels, etc., hardware and locks, height of writing bed.

References.—Sheet iron and steel. *See also* 604.0, 604.22, 604.23. Desk locks. *See* 617.21. Wooden desks. *See* 435.3.

613.5 LOCKERS AND SAFES

Underwriters' Laboratories. Minimum Burglary Resistance of Key-Locked Safes; 1927. Practibility and durability of safe and locking mechanism, time limit on resistance to burglar attack, mounting requirements, tests for lock picking, drifting and drilling, door sledging and wedging, dismounting, and fishing test.

Underwriters' Laboratories. Relocking Devices for Safe and Vault Doors; 1927. General design requirements, test requirements for relocking when combination is tampered with, and for releasing.

Underwriters' Laboratories. Safes and Insulated Cabinets; 1918. Classification according to fire resistance and strength, general design and strength requirements, fire retardant, impact, and fire stream test requirements.

U. S. Gov., Dept. of Commerce. Bureau of Standards R35–28; 1928. Steel Lockers. Simplified practice recommended and accepted by industry establishing a limited schedule of stock sizes and dimensions for single, double, and multiple tier steel lockers.

U. S. Gov., Federal Specifications Board. 60a; 1928. Safes and Cabinets, Insulated. Type I with structural frame, Type II without structural frame, 3 classes of each type dependent on degree of heat insulation. Construction and sectional area of iron or steel structural frames and metal shells, maximum weights, construction, materials, and design of base, doors, locking devices fire test and impact test requirements.

U. S. Gov., Federal Specifications Board. 68a; 1925. Sterilizers, Dressing Containers, etc. For portable lockers of terneplate, requirements on dimensions, watertightness, thickness of metal, and finish, to be located under combination of sterilizing outfits.

U. S. Gov., Federal Specifications Board. 471; 1927. Cupboard and Locker Equipment, Steel. Type A, clothing cupboard; type B, stationary cupboard; type C, double tier locker; type D, single tier locker; in 3 classes full louvered, semi-louvered, and full perforated. Gages of black sheets for cupboards and lockers, for shelves and doors, construction and finish requirements, requirements for locks and handles, dimensions of double and single tier lockers.

U. S. Gov., Federal Specifications Board. AA–S–71; 1930. Burglar Resisting Safes. For safes offering resistance to edge cutting tools, explosives, and heat destruction, of 2 types dependent on resistance to oxyacetylene torch, requirements on construction of 5 ply steel, quality of packing, of steels and bronze, thickness and construction of walls and door by laminated method, construction of parts and compartments, hardening of outer layer of body, test of fit of door, drilling resistance, strength, ductility and hardness of steels, fire and acid proof qualities of packing, requirements and methods of oxygen lance test and cutting torch test, minimum dimensions.

References.—Masonry vaults. *See* 518.59. Sheet iron and steel. *See also* 604.0, 604.21, 604.22. Terneplate. *See also* 604.31.

613.6 TABLES

American Railway Assn. Telegraph and Telephone Section. 2–G–38; 1928. Telegraph Table. Units for building up tables of any number of operating positions, frame work of steel angles and sheet steel, top of veneered wood, dimensions and construction details, assembly schedule.

American Railway Assn. Telegraph and Telephone Section. 2–G–39; 1928. Dispatchers' Tables. For single position and double position tables, made of sheet steel with steel shelves and drawers, gage of metal, construction details and dimensions, material and finish of hardware and accessories.

American Railway Assn. Telegraph and Telephone Section. 2–G–40; 1928. Table Rail. For use on telegraph table, dimensions of oak table rail and support, of holding down bolts, and assembled rail with table, enamel finish.

American Railway Assn. Telegraph and Telephone Section. 2–G–42 and 2–G–43; 1929. Apparatus Shelf ARA–1–A and ARA–2–A. Requirements on materials and method of construction of wooden shelf with angle iron supports for mounting on standard telegraph tables ARA–1–A and ARA–2–A respectively, design and dimensions.

American Railway Assn. Telegraph and Telephone Section. 2–G–45; 1929. Train Order Table Top ARA–1–A. For use in connection with framework of telegraph table ARA–2–A, requirements on table top construction of chestnut with oak veneer finish, dimensions and design.

American Railway Assn. Telegraph and Telephone Section. 2–G–49; 1929. Telegraph Table ARA–2–A. For tables of steel framework with wood tops and typewriter drops, list of main and intermediate units required for various length tables, list of parts making up each unit, construction of top of chestnut with oak veneer, design and dimensions of assembled units and of detail parts.

U. S. Gov., Federal Specifications Board. OO–L–131; 1931. Laundry Appliances. Laundry tables and starch tables. Requirements on dimensions of white wood top, supported on metal legs, general quality of wood, height of legs for laundry tables, acceptable materials for metal covering for starch table tops.

References.—Iron and steel sheets. *See also* 604.0, 604.22, 604.23. Wooden tables. *See* 431.51, 435.3.

613.7 FILING FURNITURE

U. S. Gov., Federal Specifications Board. AA–F–791; 1930. Sectional Steel Office Furniture and Cabinets. All sections to intermember with and match with standard sections adopted by the General Supply Committee. Includes small sections, horizontal sections, upright sections, and card filing cabinets, requirements on chemical composition of bronze hardware, sheet metal thicknesses for various parts, construction details, including spot welding and drawer suspension, dimensions, including dimensions of bookcase sections with disappearing glass doors.

References.—Iron and steel sheets. *See also* 604.0, 604.22, 604.23. Wooden filing furniture. *See* 435.5.

613.9 MISCELLANEOUS METAL FURNITURE AND FIXTURES

National Board of Fire Underwriters. Containers for Storing and Handling Flammable Liquids; 1927. Includes cabinets for storing cans of flammable liquids, gage of sheet iron, provision of double walls, type of lock requirements.

References.—Iron and steel sheets. *See also* 604.0, 604.22, 604.23.

614. STOVES AND FURNACES, EXCEPT ELECTRIC

614.0 GENERAL ITEMS

American Gas Assn. Requirements for House Piping and Appliance Installation; 1928. Fundamental requirements stated that will insure safety and satisfactory service in installation of piping and approved appliances, and recommended practice in piping, turning on gas, metering, appliance installation and flue connections to meet the requirements.

American Gas Assn. and Nat. Bureau of Standards, sponsors under auspices of American Standards Assn. A. S. A. serial K 2–1927. Gas Safety Code, for Installations and Work in Buildings. Definitions, rules for gas fitting and for installation of gas appliances with notes amplifying the rules.

Associated Factory Mutual Fire Insurance Companies. Fuel Oil Installations for Furnaces and Engines; 1928. Includes precautions to be observed in the installation of fuel oil burners, as regards reheating and atomizing the oil, the use of automatic interlocking valves and the arrangement of furnaces.

National Board of Fire Underwriters. Installation, Maintenance and Use of Piping and Fittings for City Gas; 1920. Applies to gas piping in buildings, minimum sizes of pipe, installation of pipe, types, and locations of valves, threading, branching and bending of pipe, pipe supports, size and location of outlets, maintenance rules.

Railway Fire Protection Assn. Handbook; 1925. General Recommendations in Connection with Chimneys, Flues, Stoves, and Furnaces. Recommendations on construction, location, protective coverings, nearness to combustible materials and structures, type of ash containers, etc.

614.1 COAL STOVES AND RANGE BOILERS

U. S. Gov., Dept. of Commerce. Bureau of Standards R8–29; 1929. Range Boilers and Expansion Tanks. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes and capacities of range boilers and expansion tanks, diameters and lengths, limitation to 2 pressure classes, standard location of tappings.

References.—Installation rules. *See also* 614.0. Unfired pressure tanks. *See also* 605.23. Other tanks. *See* 956.2. House heating boilers, coal burning. *See* 614.4. Coal burning tank heaters. *See* 614.9.

614.2 GAS STOVES, RANGES, AND WATER HEATERS

American Gas Assn. Approval Requirements for Gas Ranges; 1930. Construction requirements as regards sheet metal, frame, lining, burners, cocks, etc., performance as regards burner and heating capacities, heat distribution, leakage, safety features, thermal efficiency, diagrams of standard range types and gas cocks.

American Gas Assn. Approval Requirements for Gas Water Heaters; 1931. Classification, data to be furnished by manufacturer, construction and performance requirements for all types of gas water heaters, including combustion, fire hazard, relief valve operation, the thermal efficiency, standby loss, and drawing showing minimum dimensions of plug type gas cock.

American Gas Assn. Approval Requirements for Hot Plates and Laundry Stoves; 1929. Requirements on thicknesses of metal parts, sizes of bolts, structural features, test requirements for burner capacities and operating charactertistics, lighters, fire hazard, non-production of carbon monoxide, burner efficiency, coating of sheets, etc.

American Gas Assn. Approval Requirements for Space Heaters; 1931. Construction of body, burner, gas connections and shut-offs, flue outlet, etc., performance with standard gases and pressure, burner operation, adjustments of air and gas, venting, heating efficiency, etc., definitions.

Underwriters' Laboratories. Compressed Gas Systems other than Acetylene for Lighting and Heating; 1928. Includes stoves and ranges, of noncombustible material, minimum gage of sheet metal used, requirements for drip pans and construction and attachment of stove legs.

U. S. Gov., Dept. of Commerce. Bureau of Standards T304; 1926. Method for Testing Gas Appliances to Determine Their Safety from Producing Carbon Monoxide. For forced tests and normal operation tests, description of tests developed at bureau for determination of flash-back, blow-off, and yellow-tip curves, determination of limit of complete combustion, and of normal injection curve, typical test results.

References.—Installation rules. *See also* 614.0. Other heating and ventilating equipment. *See* 792. Unfired pressure tanks. *See also* 605.23. Other tanks. *See* 956.2. Gas house heating equipment. *See also* 614.4. Gas and gas appliances. *See also* 997.2. Acetylene equipment and lamps. *See* 997.5. Gas garage heater. *See* **614.9.**

614.3 OIL AND GASOLINE STOVES, RANGES, AND WATER HEATERS

Underwriters' Laboratories. Compressed Gas Systems other than Acetylene for Lighting and Heating; 1928. Includes stoves and ranges, of noncombustible material, minimum gage of sheet metal, requirements for drip pans, construction and attachment of stove legs, etc.

Underwriters' Laboratories. Gasoline Stoves for Cooking and Heating; 1928. General construction, design, thickness requirements, and operating characteristics of stove frame, lift out tanks, pressure tanks, generators and burners, valves, piping, fittings, gages, antiflooding devices, pressure test requirements for pressure tanks, stability requirements for portable stoves.

Underwriters' Laboratories. Kerosene Stoves for Cooking and Heating; 1927. Stationary type not requiring other fuels for securing generation, general design requirements for frame and legs, minimum thickness of sheet metal supporting parts, capacity, general design, material and thickness of walls of liftout tanks and founts and of pressure tanks, pressure test requirements for pressure tanks, general design, types, materials and operation of generators, burners, valves, piping, and antiflooding device.

Underwriters' Laboratories. Portable Kerosene Heaters; 1924. Construction and thickness of sheet metal of drum radiator, center section, lower drum and legs, construction and attachment of handle, latch and hinge, thickness of brass or terneplate in fuel reservoir, design of wick operating mechanism, stability, fire safety test of heater, pressure test requirements for reservoir.

References.—Installation rules. *See also* 614.0. Unfired pressure tanks. *See also* 605.23. Other tanks. *See* 956.2. Other heating and ventilating equipment. *See* 792. Gasoline, fuel oil, kerosene. *See* 503.3, 503.4, 503.5. Oil burners and heaters. *See also* 614.9.

614.4 HOUSE HEATING BOILERS, RADIATORS, AND HOT-WATER TANKS

American Gas Assn. Approval Requirements for Central House Heating Gas Appliances; 1930. Burners, cocks, air mixer, regulating and safety feature requirements for gas boilers and gas warm air furnaces, performance requirements as regards pressure regulation, burner and pilot operation, heating efficiency, and fire hazard.

American Society of Heating and Ventilating Engineers. Code for Testing Radiators; 1927. Measurements and method of making them for determining the rating of each type and style of radiator in capacity for heat emission instead of a heating surface rating.

American Society of Heating and Ventilating Engineers. Proposed Code for Testing Steam Heating Boilers Burning Oil Fuel; 1931. Requirements on set-up of oil burner and boiler, test equipment, fuel sampling, test procedure for the continuous test and for the intermittent test, data forms, calculations, for determining heat efficiency and performance characteristics.

American Society of Heating and Ventilating Engineers. Pipe Sizes for Steam Heating Systems. *See* Heating and Piping Contractors National Assn.

American Society of Heating and Ventilating Engineers. Committee Report on Rating Low Pressure Heating Boilers; 1929. Definition, required rating data, chart for determining rating for solid fuel boilers, including anthracite rating and bituminous rating.

American Society of Heating and Ventilating Engineers. Code for Testing Low-Pressure Steam Heating Solid Fuel Boilers; 1929. Definitions, test apparatus, set-up, and measurements required, fuel sampling, methods of conducting tests, forms and formulae for determining heat balance and efficiency, and for constructing performance charts.

American Society of Heating and Ventilating Engineers, National Assn. Sheet Metal Contractors, and National Warm Air Heating Assn. Standard Code Regulating the Installation of Gravity Warm Air Heating Systems; 1929. Definitions, flue and chimney specifications, multipliers and divisors and their use in determining sizes of warm air pipes, wall stacks and furnaces for use in residences, installation rules for furnaces, pipes, and registers.

American Society of Mechanical Engineers. Boiler Construction Code. Section IV; 1927. Boilers Used Exclusively for Low-Pressure Steam Heating, Hot-Water Heating, and Hot Water Supply. Cast Iron Boilers. (Does not include range boiler and gas water heaters for domestic hot-water supply.) Working pressure and temperature limits, requirements as to boiler openings, installation, fittings and appliances, and hydrostatic tests.

American Society of Mechanical Engineers Boiler Construction Code. Section IV; 1927. Boilers Used Exclusively for Low-Pressure Steam Heating, Hot-Water Heating, and Hot-Water Supply. (Does not include range boiler and gas water heaters for the production of domestic hot-water supply.) Steel-Plate Boilers. Limiting working pressure and temperatures, strengths of material for use in design, minimum thickness of plates and tubes, efficiency of joints, construction and allowable working pressure for braced and stayed surfaces, requirements as to boiler openings, setting and installation, fittings and appliances, hydrostatic tests, requirements for autogenously welded boilers including design, construction and materials.

Heating and Piping Contractors National Assn. Figuring Radiation; 1930. Methods of computing required area of heat radiators for houses based on heat transmission through various types of walls, ceilings, floors, and windows, with allowances for relative location of room as regards exposure to wind, and location of house as regards usual winter temperatures, allowances for crack leakage.

Heating and Piping Contractors National Assn. Net Square Feet Radiation Loads in 70° F., Recommended for Low Pressure Heating Boilers; 1928. Tables of radiation loads as a function of grate area for round boilers of various types with minimum chimney areas and for square boilers, based on direct cast-iron column radiation and on use of coal of a given heat value, for steam and hot water heat.

Heating and Piping Contractors National Assn., American Society of Heating and Ventilating Engineers. Pipe Sizes for Steam Heating Systems; 1930. Published by H. P. C. N. A. Tables of equivalent radiation loads for various pipe sizes supplying the radiator system for lengths of run up to 600 feet based on chosen pressure drop, for 1 and 2 pipe gravity systems, vapor systems, and vacuum systems.

Institute of Boiler and Radiator Manufacturers. Steam Heating Boiler Testing Code; 1929. For solid fuel burning, low pressure steam boilers, rules for set-up for test, starting and stopping test, test procedure and readings, computations and forms.

National Assn. Sheet Metal Contractors. Standard Practice in Sheet Metal Work; 1929. Section V, Warm Air Furnaces. Definitions of terms, standard code for installation of gravity warm air heating systems for residences, heating and ventilating symbols, firing methods, design data on pipe capacities, humidity, heat transmission through walls, and typical designs for residences, stores, forced air systems, factory and garage systems, 45 illustrative drawings and graphs.

National District Heating Assn. Rules for Computing Required Radiation; 1919. Formulas for computing radiator area for heating buildings with steam, vapor, or hot water allowing for specified number of air changes in given time and computing radiation through walls, windows, ceiling, etc. by use of tabulated constants, tables of coefficients of heat transmission from radiators, etc.

National Warm Air Heating Assn. Standard Code Regulating the Installation of Gravity Warm Air Heating Systems in Residences; 1930. Definitions, flue and chimney specifications, multipliers and divisors and their use in determining sizes of warm air pipes, wall stacks, and furnaces, installation rules for furnaces, pipes, and registers.

U. S. Gov., Dept. of Commerce. Bureau of Standards R25; 1924. Hot Water Storage Tanks. Simplified practice recommended and accepted by industry establishing a limited list of standard dimensions and capacities, limitation to 2 pressure classifications, standard location and number of tappings and other openings, standard sizes and lengths of heating coils, factors of safety, thicknesses, etc., in accordance with Am. Soc. of Mech. Engrs. code for "Nonfired pressure vessels."

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures (For Land Use). Water Heater and Horizontal Storage Tank, Water Heater and Vertical Storage Tank. For circular cast-iron coal burning heater, depth of fire pot, hydrostatic test requirements for heater sections, type of grate, main dimensions for 3 sizes of heater. For steel tank, dimensions for 3 sizes, requirements for strength of steel, hydrostatic test of tank, size of pipe, method of support and piping connections, sizes and types of relief valves, thermometer, and regulator, heating surface and general construction of steam heating coils where such are installed inside tank.

References.—Installation rules. *See also* 614.0. Boiler plates. *See also* 604.11. Gray cast iron. *See also* 611.11. Fire brick. *See also* 534.12. Other heating and ventilating equipment. *See* 792. Unfired pressure vessels. *See also* 605.23. Gas and gas appliances. *See also* 997.2.

614.9 MISCELLANEOUS HEATING AND COOKING EQUIPMENT

American Oil Chemists' Society. Methods of Chemical Analysis; 1930. Jacketed Oven. Official oven used for determination of moisture, requirements on dimensions and general design for oven jacketed with glycerine and water.

Associated Factory Mutual Fire Insurance Companies. Gravity Water Tanks and Steel Towers, vol. 2; 1929. Piping, Fittings and Heating Systems. For water tanks, general requirements for steam heaters and for coal burning heaters, recommended designs and makes of heaters.

National Board of Fire Underwriters. Installation and Operation of Acetylene Equipment for Lighting, Heating, and Cooking; 1930. Covers 6 classes of equipment, as stationary, automatic, portable, dissolved acetylene, etc., for use in and about buildings, requirements on location of generator, on construction, ventilation, and heating of outside generator houses, sizes and capacities of pipe, requirements for conductor and escape piping, operation of generators, storage and installation of cylinders, storage of calcium carbide.

National Board of Fire Underwriters. Ovens for Japan, Enamel, and Other Flammable Finishes; 1931. Regulations on location, general arrangement and construction of brick, concrete, or steel and noncombustible material ovens, provision of explosion relief, ventilation and heating equipment, fire protection, water sprinkler equipment, etc.

Underwriters' Laboratories. Fuel Oil Burners for Domestic Use; 1928. Flashpoint requirements for fuel oil, general assembly and operation requirements, general design, operation and permissible use of oil lines, strainers, oil regulating valves, draft regulators, pumps, packing, valves, antiflooding devices, floats, overflow cups, drains, base, fire pots, gas pilots, electric ignition transformers, leads, electrodes, and insulators, oil pilot lights, steam generators, vacuum tanks, sight feed, and electrical equipment and wiring.

Underwriters' Laboratories. Gas Garage Heaters; 1917. General construction and installation of heat radiating drums, thickness of metal, dimensions and perforation of inlet screens, general construction of outside casing, rain caps, flue and air inlet pipes, doors, ignition devices, piping and valves, brackets and supports.

Underwriters' Laboratories. Proposed Standard. Oil Burner High Tension Electric Ignition Systems; 1928. Installation and safety requirements for ignition transformers and high tension leads, installation and flash over test of ignition electrodes and bus bars, design of porcelain insulators for ignition.

Underwriters' Laboratories. Oil Heated Incubators; 1927. General construction of wooden case and protection of parts near heater, construction and mounting of heaters, metal gauge, galvanizing, joint structure requirements for lamps, and drip pan.

References.—Installation rules. *See also* 614.0. Other heating and ventilating equipment. *See* 792. Other acetylene equipment. *See* 997.5. Gas and gas appliances. *See also* 997.2. Electric heating and cooking equipment. *See* 717.1. Starch cookers for laundry. *See* 787. Heating equipment for power boilers. *See* 703.9. Oil burner ignition transformers. *See also* 713.5.

615. HAND TOOLS, METAL WORKING

615.1 CHISELS, DRILLS, PUNCHES, REAMERS, TAPS, AND DIES

615.11 Chisels

U. S. Gov., Dept. of Commerce. Bureau of Standards R17–31; 1931. Forged Tools. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes of track chisels, blacksmith chisels, agricultural tools and blacksmith tools.

References.—Heat treatment of chisels. *See* 600.5. Chisels for pneumatic tools. *See* 615.9. Wood working chisels. *See* 616.13. Railway track chisels. *See* 616.8.

615.12 Drills

U. S. Gov., Federal Specifications Board 417; 1926. Drills, Breast. For single speed type equipped with spirit level, materials, construction, and general dimensions.

U. S. Gov., Federal Specifications Board. 509. Drills, Hand, with Hollow Handle. Frame of malleable iron or other material, general construction requirements and materials for hand drill with wooden handles, chucks to accommodate drill shanks from 0 to ⅜ inch, approximate dimensions and weight.

References—Tool steel, alloy tool steel. *See also* 603.32, 621.35. Heat treatment of tool steels. *See also* 600.5. Electric drills. *See* 711.24.

615.13 Punches

U. S. Gov., Dept. of Commerce. Bureau of Standards. R17–31; 1931. Forged Tools. Simplified practice recommended and accepted by industry establishing a limited number of standard sizes and types of tools including blacksmith punches, backing out punches, bull points, track and tie plug punches, drift pins.

615.14 Reamers

References.—Electric reamers. *See* 711.24.

615.15 Taps and Dies

American Society of Mechanical Engrs. Joint sponsor with Society of Automotive Engrs. and Nat'l Machine Tool Builders Assn. Approved by American Standards Assn. as B 5e–1930. Taps, Cut and Ground Threads. Dimensions and tolerances for machine screw taps, hand taps, tapper taps, nut taps, and pulley taps, the same as those recommended by National Screw Thread Commission.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R51–29; 1929. Die-Head Chasers for Self-Opening and Adjustable Die Heads. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes and threads per inch for national coarse thread and fine thread series, for S. A. E. spark plug and bushing thread, for lighting fixture and fitting thread, for railway sizes, and for pipe thread.

U. S. Gov., National Screw Thread Commission. Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. Recommended practice for taps. For American National coarse and fine thread series, dimensions and tolerances for cut and ground thread machine screw taps, hand taps, tapper taps, nut taps, and cut thread pulley taps, tolerances for taps for special diameters and pitches, taper pipe thread tap dimensions, Acme screw thread tap dimensions and tolerances.

References.—Tool steel, alloy tool steel. *See also* 603.32, 621.35. Heat treatment of taps. *See also* 600.5. Machine tool elements. *See also* 765.

615.2 HAMMERS AND SLEDGES

615.20 General Items

U. S. Gov., Dept. of Commerce. Bureau of Standards R17–31; 1931. Forged Tools. Simplified ards R17–29; 1929. Forged Tools. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes of sledges and heavy hammers, sizes of eyes, blacksmith tools, and soil working tools.

615.21 Hammers

References.—Standard sizes. *See also* 615.20. Carbon tool steel. *See* 603.22, 603.32. Alloy tool steel. *See* 621.35. Forged steel. *See* 611.51, 622.6. Wooden handles. *See* 428.20, 428.29. Heat treatment. *See also* 600.5

615.22 Sledge Hammers

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Double Faced Sledge; 1929. Design, dimensions and tolerances, for 6 sizes from 6 to 16 pounds, hardness requirements, dimensions of handle.

References.—*See* references under 615.21. Railway spike maul. *See also* 616.8.

615.3 PINCERS, PLIERS, PLIER CUTTERS, AND SHEARS

615.31 Pincers

615.32 Pliers and Plier Cutters

615.33 Shears

U. S. Gov., Federal Specifications Board. 451; 1926. Shears, Tinners', Hand (Snips). Two types, straight cut, and circular type, construction, minimum weight and length, length of cut, made entirely of steel.

References.—Office scissors. *See* 612.13. Carbon and alloy tool steels. *See* 603.22, 621.35. Forged steel, *See* 611.51, 622.6. Heat treatments. *See* 600.5.

615.39 Miscellaneous Cutting Tools

U. S. Gov., Federal Specifications Board. 437; 1926. Cutters, Pipe. 3-Wheel cutter type, construction and dimensions for 3 sizes with malleable iron or steel frame.

References.—Carbon and alloy tool steels. *See* 603.22, 621.35. Malleable cast iron. *See* 611.21. Heat treatments. *See* 600.5.

615.4 VISES, WRENCHES, AND VISE CLAMPS

615.41 Vises

615.42 Wrenches

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Track Wrenches; 1929. Design, dimensions and dimension tolerances on double end and single end wrenches for bolt sizes from ¾-inch to 1½-inch, hardness requirements.

American Society of Mechanical Engineers. Joint sponsor with Society of Automotive Engineers under procedure of American Standards Assn. A. S. A. serial B 18b–1927. Wrench Head Bolts and Nuts and Wrench Openings. Tables of dimensions and tolerances for square and hexagonal bolt heads, nuts, hexagonal cap screw heads, set screw heads, machine screw and stove bolt screw nuts, and open end wrench openings.

Society of Automotive Engineers. 1931 Handbook. Cap Screws, Bolts and Nuts, and Wrench Openings; 1930. Standard dimensions of wrench openings as approved by American Standards Assn. as American Standards.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R17–31; 1931. Forged Tools. Simplified practice recommended and accepted by industry establishing a limited number of standard sizes and varieties of tools including single end and double end track wrenches.

U. S. Gov., National Screw Thread Commission. Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. Wrench head bolts and nuts and wrench openings. Standards are the same as those of Am. Soc. of Mech. Engrs. and Soc. of Auto. Engrs. given in Am. Standards Assn. B 18b–1927.

615.43 Vise Clamps

615.5 ANVILS, BELLOWS, HARDIES, AND FORGES

615.51 Anvils

615.52 Bellows

615.53 Hardies

References.—Standard sizes. *See* 615.55.

615.54 Forges

615.55 Miscellaneous Blacksmith Tools

U. S. Gov., Dept. of Commerce. Bureau of Standards. R17–31; 1931. Forged Tools. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes of blacksmith anvil tools and tongs, track chisels, rivet tongs, hammers, and soil working tools.

References.—Carbon and alloy tool steels. *See* 603.22, 621.35. Forged carbon and alloy steel. *See* 611.51, 622.6. Heat treatments. *See* 600.5.

615.6 FILES, RASPS, HACK SAWS, AND SCRIBERS

615.61 Files

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1928. Standard Files (except special purpose). List of recommended standard types and sizes of files.

U. S. Gov., Dept. of Commerce. Bureau of Standards R6; 1923. Files and Rasps. Simplified practice recommended and accepted by industry establishing a limited list of standard types and sizes of files and rasps.

References.—Dental files. *See also* 915.10.

615.62 Hack Saws

U. S. Gov., Dept. of Commerce. Bureau of Standards R90–29; 1929. Hack-Saw Blades. Simplified practice recommended and accepted by industry covering a limited selected list of standard sizes of hand and of power hack-saw blades, standard tungsten and carbon-steel, and high-speed types, widths, thicknesses, and number of teeth.

U. S. Gov., Federal Specifications Board. 415a; 1928. Blades, Hack saw. In 4 types; hand frame blades, all hard and flexible; machine blades, all hard and all hard for cutting corrosion resisting steels, all types of alloy tool steel, the flexible type being hardened on cutting edge only. Dimensions and number of teeth, work value test requirements for blades of 10 to 32 teeth per inch.

U. S. Gov., Federal Specifications Board. 479; 1927. Frames, Hack Saw. General construction requirements for ordinary type of hack-saw frame made of steel and adjustable for 8, 10, and 12 inch blades, minimum clearance 2¼ inches, illustrated.

U. S. Gov., Federal Specifications Board. 480; 1927. Saws. Band saw, metal cutting, and hand hack saw. General requirements for steel, and of wooden handle for the metal cutting hand saw, type of set, points per inch, and dimensions of various sizes.

References.—Carbon and alloy tool steels. *See* 603.22, 603.32, 621.35. Heat treatment. *See also* 600.5. Wood saws. *See* 616.17.

615.63 Rasps

U. S. Gov., Dept. of Commerce. Bureau of Standards. R6; 1923. Files and Rasps. Simplified practice recommended and accepted by industry establishing a limited list of standard types and sizes of files and rasps.

615.64 Scribers

U. S. Gov., Federal Specifications Board. 441; 1926. Scribers, Machinists. Double point type of tool steel, with hardened and tempered points, and adjustable grip sleeve, construction requirements and dimensions.

References.—Carbon tool steel. *See* 603.32. Heat treatment. *See* 600.5.

615.7 TINNERS AND COPPERSMITHS TOOLS

615.71 Soldering Coppers

U. S. Gov., Federal Specifications Board. 439; 1926. Coppers, Soldering. For regular tinner's point and for flat wedge point, dimensions of various sizes of wrought copper body and of iron or steel handle rod, illustrated shapes of the two types.

References.—Copper rods. *See also* 642.11.

615.72 Blow Torches and Soldering Pots

615.73 Bench Plates and Stakes

615.8 MEASURING TOOLS

References.—Levels, plumbs, rules, squares, tapes. *See* 616.3. Hydrometers, thermometers, and scientific measuring instruments. *See* 919.

615.81 Calipers and Dividers

U. S. Gov., Federal Specifications Board. 436; 1926. Dividers. For machinists dividers of 3 types, spring, firm joint, and wing or adjusting arc types, made of high-grade steel, requirements on general structural features, sizes, with general illustrations of types, samples may be requested by purchaser.

615.82 Gages, Dimension

American Petroleum Institute. Standard No. 5–A; 1931. Pipe Specifications. Including plug and ring thread gages for drill pipe, casing, and tubing, requirements on dimensions and tolerances, recommendation for use of alloy steel, notes on gaging practice.

American Petroleum Institute. Standard No. 5–L; 1931. Line Pipe. Includes plug and ring thread gages for line pipe, requirements on dimensions and tolerances, recommendations for use of alloy steel in construction, notes on gaging practice.

American Petroleum Institute. Standard No. 7–B; 1931. Rotary Drilling Taper Joints. Includes master plug gages for taper joints, requirements on structural features, basic thread, dimensional tolerances.

American Petroleum Institute. Standard No. 11–A and Supplemental No. 1; 1931. Standard gages with dimensions and tolerances for measurement of working barrels of oil-well pumps.

American Petroleum Institute. Standard No. 11–B; 1931. Sucker Rods for Pumping Purposes. Includes threads, dimensions, and tolerances for plug and ring gages for threads of sucker rods.

American Railway Assn. Mechanical Div. Recommended Practice. Round Iron, Limit Gages for; 1911. For double end, "go" and "no go" gages, dimensions of large end and of small end for nominal round iron for taking Sellers' standard screw thread.

American Railway Assn. Mechanical Div. Decimal Gage; 1895. Dimensions of elliptical solid notch gage for diameters from 0.002 inch to 0.250 inch.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Track Gage; 1929. Design, dimensions, and tolerances for standard track gage.

American Society of Mechanical Engineers under procedure of American Standards Assn. B 4a–1925. Tentative Standard Tolerances, Allowances and Gages for Metal Fits. Definitions, classifications of fits, tables of diameter tolerances for various fits for shaft and hole members, tables of negative tolerances for force fits and the force required for pressing in shaft.

Glass Container Assn. of America. Glass Finish and Gages; 1929. Includes dimensions of standard diameter gages for more than 30 finishes for jar and bottle tops.

National Electric Light Assn. Suggested Specification. D 107–22; 1922. Cross Arm Gage. Dimensions of steel plug type gage for measurement of pin and bolt holes in cross arms, allowable variations. Published in 1924 Proceedings of N. E. L. A.

National Electric Light Assn. Suggested Specifications. D996–28T; 1928. Tentative. 1-inch and 1⅜-inch Insulator Gages. D995–28T; 1928. Tentative. 1-inch and 1⅜-inch Insulator Gage Thread. Dimensions and design for tool steel thread gage, detail dimensions and allowable variations for gage thread for 4 threads per inch.

National Electric Light Assn. Suggested Specifications. D997–28T; 1928. Tentative. 1-inch and 1⅜-inch Insulator Pin Gages. Dimensions of tool steel gage for insulator pin threads, details of thread according to N. E. L. A. specification D990–28T.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS8–30; 1930. Plain and Thread Plug and Ring Gage Blanks. A commercial standard recommended by the American Gage Design Committee and accepted by industry. Establishes standards of design and construction, with dimensions of standard sizes of gage blanks, handles, and mating parts, for taper lock and reversible designs of plain cylindrical plug and thread plug gages, design, dimensions, and construction of standard sizes of plain and thread ring gage blanks; dimensions and design of taper plug and ring gages for checking taper lock handles and gaging members.

U. S. Gov., Dept. of Commerce. Bureau of Standards. LC22; 1919. Measurement of Taper Gages. Describes standard methods used by the gage section of Bureau of Standards for measuring tapered plug and ring gages of single and multiple tapers, with illustrations of computations.

U. S. Gov., Dept. of Commerce. Bureau of Standards. LC23; 1923. Measurement of Pitch Diameter of Screw Thread Gages. Describes and illustrates standard methods of measurement used in gage section of bureau for plug and ring screw thread gages, straight and tapered, symmetrical and unsymmetrical, including the 3-wire and 3-ball methods and design of check plug for ring gages, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards. S436; 1922. Interference Methods for Standardizing and Testing Precision Gage Blocks. For gage blocks with plane and parallel ends a specified distance apart and used for checking micrometers, methods of measuring the length of gage, the planeness and parallelism of ends are described using light waves as standards and using the interference phenomena of light waves. Method of comparing gages with standards are described and illustrated.

U. S. Gov., National Screw Thread Commission. Publ. MS9 of Bureau of Standards, 1929. Report of National Screw Thread Commission; 1928. Screw thread gages, for American National threads, for special threads, for fire hose coupling threads, for pipe threads, and for Acme threads, limiting dimensions and tolerances. Includes 3 classes of gages based on accuracy, for bolt and machine screw thread gages.

References.—Gages for railway car wheels. *See* 611.53, 611.18. Gages for railway car gears. *See* 611.55. Gages for railway brake shoes. *See* 611.43. Gages for car journal bearings. *See* 692.3. Rules and measuring tapes. *See also* 616.33, 616.35. Gages for railway car truck bolsters, center plates, and truck sides. *See* 605.13. Pressure and vacuum gauges. *See* 793.2, Carbon and alloy tool steels. *See* 603.22, 603.32, 621.35. Heat treatment. *See also* 600.5. Gages for cable drilling tool joints. *See* 754.

615.9 MISCELLANEOUS METAL-WORKING TOOLS

Compressed Air Society. Trade Standards; 1930. For pneumatic tools, standard dimensions of tool heads and sleeves for riveting hammers, chisels, and scaling hammers.

U. S. Gov., Federal Specifications Board. 440; 1926. Sets, Hand Saw. Hinged lever type saw set operated by hand, incorporating a plunger and anvil, operating and construction requirements, for saws up to 0.065 thickness, 4 to 16 teeth per inch.

U. S. Gov., Federal Specifications Board. 474; 1927. Ladles, Plumbers. Double-lip type of wrought iron or steel, general design, dimensions of 6 sizes.

References.—Electric tools, drills, reamers, buffers, and grinders. *See* 711.24.

616. HAND TOOLS OTHER THAN METAL-WORKING TOOLS

616.1 EDGE TOOLS

616.11 Adzes, Axes, and Hatchets

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Track Adz; 1929. Design, dimensions and tolerances, for 3 standard sizes, hardness requirements, dimensions of handle.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R17–31; 1931. Forged Tools. Simplified practice recommended and accepted by industry establishing a limited number of standard sizes and types of tools including 3 sizes of track adzes.

U. S. Gov., Federal Specifications Board. 433; 1926. Hatchets. Shingling hatchets only, of forged tool steel, hardened, tempered, and ground, dimensions and tolerances, finish, handles according to F. S. B. specifications for hickory handles.

U. S. Gov., Federal Specifications Board. 449; 1926. Adzes. Four types, carpenter's adze, plain; ship carpenter's adze, plain type, lipped type; railroad adze, plain. Of forged tool steel with handles according to F. S. B. specifications for hickory handles, construction described and illustrated, dimensions.

References.—Carbon tool steel. *See also* 603.32. Forged steel. *See also* 611.51. Wooden tool handles. *See* 428.20, 428.29.

616.12 Augers and Carpenters' Braces

U. S. Gov., Federal Specifications Board. 416; 1926. Braces, Ratchet. General construction and materials for various parts, for steel brace with ball bearing wooden head, for taking round cylindrical and taper shank bits of ⅛ to ½ inch, main dimensions.

616.13 Chisels

U. S. Gov., Federal Specifications Board. 438; 1926. Chisels, Gouges, and Slicks, Woodworders'. A, chisels, socket firmer; B, chisels, socket framing; C, Chisels, tanged turning; D, gouges, socket firmer, outside or inside bevel; E, gouges, tanged turning; F, slicks. Hardened, tempered and ground blades, rough dimensions for chisels and handles for various widths, cutting and turning test requirements on specified woods.

References.—Heat treatment of chisels. *See* 600.5. Chisels for pneumatic tools. *See* 615.9. Track chisels. *See* 615.11.

616.14 Drills

616.15 Knives

U. S. Gov., Federal Specifications Board. 442; 1926. Knives, Shoe. Tool steel blade, hardened and tempered, with square point, inserted in wooden handle, approximate dimensions..

U. S. Gov., Federal Specifications Board. 488; 1927. Knives, Drawing. Fixed handle and folding handle types, blades of tool steel, hardened, tempered, ground, construction, dimension of 3 sizes, cutting test requirements, and hardness test where specified.

References.—Pocket knives. *See* 612.11. Carbon-tool steel. *See* 603.32. Heat treatment. *See also* 600.5.

616.16 Planes and Scrapers

U. S. Gov., Federal Specifications Board. 450; 1926. Shaves, Spoke. Raised handle type, frame and handles of malleable iron, adjustable cutter of tool steel, hardened and tempered, principal dimensions, illustrated.

References.—Carbon-tool steel. *See* 603.32. Heat treatment of steel. *See* 600.5.

616.17 Saws

U. S. Gov., Federal Specifications Board. 480; 1927. Saws. Back saw, miter box saw, band, butcher, circular, compass, and 2-man crosscut saws, hand saw, keyhole and web saws. General requirements for steel for blades and of wood for handles, type of set, points per inch, method of attachment of handles, dimensions of various sizes of crosscut and rip saws.

References.—Carbon-tool steel. *See* 603.32. Heat treatment of steel. *See also* 600.5. Saw sets for saws. *See* 615.9. Hack saws. *See* 615.62.

616.18 Glass Cutters

U. S. Gov., Federal Specifications Board. 435; 1926. Cutters, Glass. Turret head type, single renewable wheel type, both embodying for cutting element a hardened steel wheel. Construction and cutting test requirements.

616.2 AWLS, PUNCHES, AND SCREW DRIVERS

616.21 Awls

616.22 Punches

References.—Railway track punches. *See* 616.8. Blacksmith punches. *See* 615.13.

616.23 Screw Drivers

616.3 LEVELING AND MEASURING TOOLS

References.—Calipers, dividers, dimension gages for metal working. *See* 615.81, 615.82.

616.31 Bevels and Miter Boxes

616.32 Levels and Plumbs

616.33 Rules

U. S. Gov., Federal Specifications Board. 360; 1925. Rulers. For 4 lengths of maple wood rulers, 12 to 24 inches long, requirements on width and thickness, provision of brass edge.

U. S. Gov., Federal Specifications Board. 419; 1926. Rules. For caliper rules, carpenter's folding rules, multiple folding rules, and steel rules, requirements on types of wood, brass binding and joints, for caliper and folding rules, sizes, dimensions, and graduation of all types, types of joints, and structural features.

616.34 Squares

616.35 Tapes

American Electric Railway Engr. Assn. Recommended Design. E115–26; 1926. Wheel Circumference Measuring Tape for Contours A, B, C, and D. Drawing of tape and method of application to wheel.

American Electric Railway Engr. Assn. Recommended Design. E116–26; 1926. Wheel Circumference Measuring Tape for Contours E and F. Drawing of tape and method of application to wheel.

References.—Calibration of engineer and other steel tapes. *See* 916.21. Tolerances on standard tapes. *See* 919.1.

616.4 HOOKS AND PULLERS

616.41 Hooks, for Manual Handling of Commodities

References.—Vehicle and harness hooks. *See* 603.57. Slip hooks, grab hooks, hoist or sling hooks, bale hooks and box hooks, barrel hooks and stone hoist hooks, hogshead hooks, and can hooks. *See* 603.57.

616.42 Nail Pullers

U. S. Gov., Federal Specifications Board. 418; 1926. Pullers, Nail. Rammer type nail pullers, general design and construction, principal dimensions, nail pulling test requirements.

References.—Pullers for railway track spikes. *See* 616.8.

616.5 TOOLS FOR LINE CONSTRUCTION MEN

References.—Linemen's safety belts. *See* 069.3, 311.8. Rubber lineman's gloves. *See* 203.2. Timber tongs. *See* 616.8.

616.6 SOIL WORKING TOOLS

616.60 General Items

U. S. Gov., Dept. of Commerce. Bureau of Standards. R17–31; 1931. Forged Tools. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes of picks, mattocks, hoes, bars, wedges, blacksmith anvil tools and tongs, track chisels, rivet tongs, sledges and heavy hammers, sizes of eyes.

616.61 Bars, Digging and Tamping

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Chisel End Tamping Bar, Spear End Tamping Bar; 1929. Design, dimensions and tolerances, for one standard size of each type, hardness requirements.

References.—Standard sizes. *See* 616.60. Tool steel. *See* 603.32. Chisel bars, crow bars, pinch bars. *See also* 616.91.

616.62 Hoes, Rakes, and Forks

References.—Standard sizes. *See* 616.60. Wooden handles. *See* 428.1. Tool steel, forged steel. *See* 603.22, 611.51.

616.63 Scoops, Shovels, and Spades

U. S. Gov., Dept. of Commerce. Bureau of Standards. R48; 1927. Shovels, Spades, and Scoops. Simplified practice recommended and accepted by industry establishing a limited list of standard types and sizes of shovels, spades, and scoops with dimensions of blade, type of handle, type of back, kind of finish designated.

References.—Wooden handles. *See* 428.1.

616.64 Picks and Mattocks

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Clay Pick. Design, dimensions, and dimension tolerances for one standard size, hardness requirements, dimensions of handle.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Tamping Pick; 1929. Design, dimensions, and dimension tolerances for one standard size, hardness requirements, dimensions of handle.

References.—Standard sizes. *See* 616.60. Tool steel, forged steel. *See* 603.22, 611.51. Wooden handles. *See* 428.1, 428.20.

616.7 HARVESTING, PRUNING, AND TRIMMING TOOLS

616.71 Sickles and Scythes

616.72 Shears, Grass and Hedge Cutting

616.73 Lawn Mowers

616.8 TRACK TOOLS

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Spike Maul; 1929. Design, dimensions and dimension tolerances for two standard sizes, hardness requirements, dimensions of handle.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Tie Tongs; 1929. Design, dimensions and tolerances, for one standard size.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Rail Tongs. Design, dimensions and tolerances, requirements on maximum opening, for one standard size.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Timber Tongs; 1929. Design, dimensions and tolerances, for one standard size.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Spike Puller. Design, dimensions and tolerances, for one standard size, hardness requirements.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Rail Fork; 1929. Design, dimensions and tolerances, for one standard size.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Track Chisel; 1929. Design, dimensions and tolerances, and hardness requirements for 2 sizes of standard design No. 1 and 1 size of standard design No. 2, dimensions of handle.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Round Track Punch; 1929. Design, dimensions and tolerances, and hardness requirements for one standard 5-pound punch, dimensions of eye for handle.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Tie Plug Punch; 1929. Design, dimensions, and tolerances, and hardness requirements for one standard size, dimensions of eye for handle.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R17–31; 1931. Forged Tools. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes and types of tools including the following track tools: Clay and tamping picks, spike mauls, wrenches, lining bars, rail tongs, timber and tie tongs, spike puller, rail fork, claw bar, track adzes, tamping bars, track chisels, tie plug and track punches, and track gage.

References.—Clay pick and tamping pick. *See* 616.64. Track wrenches. *See* 615.42. Lining bar, claw bar. *See* 616.91. Track adz. *See* 616.11. Double faced sledge. *See* 615.22. Tamping bars. *See* 616.61. Track gage. *See* 615.82. Tool handles. *See* 428.20, 428.29.

616.9 MISCELLANEOUS HAND TOOLS OTHER THAN METAL WORKING

616.91 Jacks, Levers, and Leverage Bars

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Lining Bar; 1929. Design, dimensions and dimension tolerances for 3 sizes of lining bars of pinch type, wedge type, and diamond point type, hardness requirements.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Claw Bar; 1929. Design, dimensions, and tolerances, for one standard size, hardness requirements.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R97–30; 1930. Bell Bottom Screw Jacks. Simplified practice recommended and accepted by industry establishing a list of standard sizes, sets up 38 sizes with stand heights from 6-inches to 24-inches, screw sizes from 1-inch to 3-inches, inclusive.

U. S. Gov., Federal Specifications Board. 434; 1926. Bars, Chisel, Crow, and Pinch. Dimensions, tolerances, chemical composition, and hardness test requirements, illustrated.

U. S. Gov., Federal Specifications Board. 481; 1927. Jacks. Seven types, bevel-geared screw; bevel-geared journal; hydraulic; lever jacks, automatic; planer or levelling jacks; screw; and motor truck jacks. Construction requirements, materials of various parts, design, dimensions of various sizes, for steel or malleable iron bevel-geared jacks, lever jacks, planer jacks, motor truck jacks, for steel hydraulic jacks, and for cast or malleable iron screw jacks, load lifting and overload test requirements.

References.—Methods of testing and general requirements for metals. *See also* 600.1. Tool steel, forged steel. *See* 603.32, 611.51. Standard sizes. *See also* 616.60.

616.92 Mallets

616.93 Trowels

U. S. Gov., Federal Specifications Board. 584; 1928. Trowels, Plastering, Cement, Brick, and Pointing. Requirements on structural features, dimensions and thickness of blades, length and largest diameter of handle, test requirements for bending under ordinary usage.

616.99 Hand Tools Not Elsewhere Classified

American Railway Assn. Mechanical Div. Packing Tools for Journal Boxes; 1928. Dimensions and design of standard packing iron and packing hook made of spring steel.

References.—Spring steel. *See* 603.33.

617. FURNITURE HARDWARE, BUILDERS HARDWARE, AND PLUMBING

617.1 HANGERS, HINGES, HASPS, AND STAPLES

617.11 Sash-Pole Hangers, Hooks, and Sash-Pole Plates

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS22–30; 1930. Builders' Hardware (Nontemplate). Sash pole hangers, sash pole hooks, sash pull plates. Sizes selected and accepted by industry as standard, materials cast iron or bronze.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Pole Hangers, Sash Pole Hooks, Sash Pull Plates, Transom Eyes. Requirements on main dimensions and finish for bronze and cast iron types of pole hangers, cast-bronze and cast-iron types of sash pole hooks, for cast bronze and cast iron sash pull plates, and for cast bronze transom eyes.

References.—Gray cast iron. *See* 611.11. Cast bronze. *See* 646.41.

617.12 Hinges

Society of Automotive Engineers. 1931. Handbook. Recommended Practice. Door Hinges; 1925. Dimensions of curved, semicurved, and straight type door hinges for passenger automobiles.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS9–29; 1929. Builders' Template Hardware. Template Butt Hinges. A commercial standard selected and accepted by industry covering dimensions, clearances, tolerances, screw sizes and varieties for full mortise, half surface, full surface, and half mortise template butt hinges of cast bronze or iron and wrought bronze or steel.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS22–30; 1930. Builders' Hardware (Nontemplate). Nontemplate Butt Hinges. Types and sizes selected and accepted as standard by industry for cast and wrought bronze butts, cast-iron butts, wrought and forged steel butts, light loose pin butts, narrow butts, fast pin cast bronze, broad, hospital type, half surface, and full surface butts, nominal weights for regular heavy weight, and extra heavy weight butts, including bushed and ball bearing types, rules for sizes of butts for various sizes of doors.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS22–30; 1930. Builders' Hardware (Non template). Spring Hinges. Types and sizes selected and accepted by industry as standard for steel and cast iron spring hinges for screen doors, for steel, brass, or bronze butt type spring hinges and floor type spring hinges, and for nickel plated brass or bronze lavatory door spring hinges.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS22–30; 1930. Builders' Hardware (Nontemplate). Strap and Tee Hinges. Types, sizes and kinds of finish of steel strap and tee hinges selected and accepted by industry as standard.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS29–31; 1931. Staple Seats for Water-Closet Bowls. Includes brass hinges for seats, a commercial standard selected and accepted by industry establishing 4 standard types, requirements on composition of brass, finish, length of studs, threading, size of bar for bar hinges, minimum weights of each type.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Butt Hinges. Requirements on general design, sizes, structural features, weight, or thickness of leaves, rules for application of the various types to various thicknesses and sizes of doors and dependent on frequency of operation, for wrought bronze, cast bronze, cast iron, and wrought steel hinges, various weights, loose pin types for cupboards, light narrow type, transom type, loose pin reversible type, wide throw type, hospital type, and half surface butt hinges, plain bearing and ball bearing types of hinges, requirements on finishes, plating, and clearances, number of balls, etc. Types illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Checking Floor Hinges. For liquid controlled types with mechanism set in floor, for double acting and single acting types, ball bearing and nonball bearing types, requirements on structural features, properties of checking fluid, adjustability of speed, sizes for various weights of doors, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Floor Surface Spring Hinge. Double acting type, exposed parts of bronze, requirements on structural features, use of ball bearings, automatic hold open feature, thickness of door to which applicable, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Hinges for Blinds. For wrought steel strap type and for cast-iron or cast-steel type, requirements on main dimensions and general design of strap type for frame and for brick construction, operating features, dimensions and weight of 3 sizes of cast type, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Lavatory Door Spring Hinges. For nickel plated bronze type and nickel bronze type, single acting, requirements on adjustability, dimensions, thickness of metal, structural features for various types of application of hinges, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Scuttle Hinges. For wrought-iron and wrought-steel types, requirements on dimensions, finish, and general design, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Spring Hinges. Double acting, butt type, for hanging strip, of wrought bronze, antifriction washers or ball bearings, requirements on dimensions of hinge, door width, and thickness to which applicable, adjustability of spring tension, for several sizes of springs.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Strap Hinges. Requirements on dimensions and thickness of metal for 6 sizes of steel strap hinges, galvanized.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. T Hinges. For ordinary type and for heavy ball bearing garage type, requirements on dimensions and thickness of metal for 2 weights of steel regular T hinges and for one weight of reversed pad T hinges, on construction and dimensions of garage hinges, type of finish required, illustrated.

References.—Cast iron, malleable iron. *See* 611.11, 611.21. Wrought-iron plates. *See* 604.14. Cast brass. *See* 645.21. Cast and wrought bronze. *See* 646.41, 646.21. Nickel plating, zinc coatings. *See also* 600.3.

617.13 Hasps and Staples

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS22–30; 1930. Builders' Hardware (Nontemplate). Hinge Hasps. For wrought steel, adjustable staple, safety type hinge hasps, lengths and thicknesses selected and accepted by industry as standard.

U. S. Gov., Federal Specifications Board. FF–H–101. 1930. Builders' Hardware, Nontemplate. Hinge Hasps. For steel hasps, open pattern and safety pattern types, requirements on length of hasp, size of screws, thickness of metal, and finish for various sizes, illustrated.

References.—Zinc coatings. *See* 600.3.

617.2 LOCKS, LATCHES, AND LOCK PARTS

617.21 Locks

American Marine Standards Committee. H No. 61–1930. Locks and Accessories for Ship Doors. Covers rim locks, regular bevel and reverse bevel for ordinary wood doors; rim lock, reverse bevel, for heavy wood doors; rim lock for steel plate doors, unfinished; rim locks, reversible, for ordinary metal doors and for heavy metal doors; rim lock, reverse bevel, for wardrobe doors and for small locker and cupboard doors; mortise lock, reversible, for light wood doors and for heavy wood doors; mortise lock for sliding doors; half mortise lock, nonreversible, for sliding doors; and mortise dead locks; made of cast bronze. Requirements on dimensions, general design, number of tumblers and key changes, types of keeper, escutcheon, and knobs, finish, application, and chemical composition of bronze.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS9–29; 1929. Builders' Template Hardware. Template Locks. A commercial standard selected and accepted by industry covering 1 and 2 bolt cylinder locks applicable to hollow metal doors, dimensions and tolerances of standard fronts and strikes, limiting dimensions of lock case, backset, bevel of front.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS22–30; 1930. Builders' Hardware (Nontemplate). Door Locks. Types selected and accepted by industry as standard with overall dimensions, backset, number of tumblers, if master keyed, general type of spring mechanism, material of the lock parts, for mortise (bit key) locks for inside doors, bathroom doors, communicating doors, front doors, vestibule doors, hotel, schoolhouse, and store doors, and sliding doors, for mortise dead locks, for upright, horizontal, and ornamental, rim-knob locks, for rim dead locks, for cylinder locks for front, vestibule, and office doors, sliding doors, schoolhouse doors, for cylinder mortise dead locks, etc.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Cabinet Locks. Covers chest locks, cupboard locks, desk locks, drawer locks, and wardrobe locks. Requirements on dimensions, material, and general design, types for various thicknesses of wood, thicknesses of sheet metal, for both brass and steel locks, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Cylinder Front Door Locks, Cylinder Vestibule or Office Door Locks, Cylinder Office Locks, Cylinder Office or Front Door Locks, Cylinder Locks for Public Toilet Rooms, Cylinder Mortise Dead Locks, Cylinder Entrance Door Locks. Requirements on dimensions, materials, finish, construction, and operation of several types, japanned iron cases, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Cylindrical Case Locks and Latches. For cylinder vestibule or office door lock and for cylinder front or office door lock, where lock case is cylindrical and inserted in large hole in door stile, requirements on installation, some dimensions, type of knobs, structural and operating features, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Elevator Door Lock. Requirements on dimensions and general design, case of cast bronze, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate, Inside Door Locks, French Door Locks, Bathroom

Door Locks, Communicating Door Locks, Front Door Locks, Mortise Dead Locks, Upright Rim Knob Locks. Requirements on dimensions, materials, finish, construction, and operation, japanned iron cases, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate, Tubular Locks and Latches. Includes dead bolt lock, case of galvanized or cadmium plated steel, requirements on construction, installation, and operating features of 5 types with and without turn knobs.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate, Unit Type Locks and Latches. Completely factory assembled type slipped into cut-away in door stile. Bathroom Door Lock, Communicating Door Lock, Cylinder Front Door Lock, Cylinder Vestibule or Office Door Lock, Cylinder Office Lock, Cylinder Office or Front Door Lock, Cylinder Locks for Public Toilet Room. Requirements on installation, dimensions, structural and operating features, knobs and escutcheons of cast bronze.

U. S. Gov., Federal Specifications Board. FF–P–101; 1930. Padlocks. For 7 design types, including 1 to 3 sizes of each type, with pin tumbler mechanisms, lever tumbler mechanisms, and warded mechanism secure type, with bronze or brass cases, plated steel cases, and laminated or solid steel cases, requirements on use of noncorrosive materials for mechanisms, structural features, weights and principal dimensions, corrosion test.

References.—Locks for safes. *See* 613.5. Desk locks. *See also* 613.4. Padlock eyes. *See* 617.23. Bolt locks. *See* 617.61. Methods of testing, general requirements for metals. *See also* 600.1. Cast iron. *See* 611.11, 611.21. Cast bronze. *See* 646.41.

617.22 Latches

American Marine Standards Committee. H No. 61–1930. Locks and Accessories for Ship Doors. For rim latch, reversible, for light wood doors, made of cast bronze, requirements on application, type of keeper, rosette and knobs, finish, dimensions and general design, chemical composition of bronze.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS22–30; 1930. Builders' Hardware (Nontemplate). Latches. Types and sizes selected and accepted by industry as standard, with amount of backset, materials of parts, for mortise knob latches, rim night latches, cylinder mortise night latches, tubular and cylinder rim night latches, thumb latches. and secret gate latches.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Cylindrical Case Locks and Latches. For 4 types of knob latches, latch case is cylindrical and inserted in large hole in door stile, requirements on installation, some dimensions, type of knobs, structural and operating features, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Mortise Knob Latches, Rim Knob Latches, Cylinder Mortise Night Latches. Requirements on dimensions, materials, finish, construction, and operation of several types, cases of japanned iron, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Rim Night Latches. Includes one type of tubular and 3 types of cylinder rim night latches, requirements on dimensions, materials, finish, construction and operation, cases of japanned iron, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Secret Gate Latches, Thumb Latches. For cast bronze secret gate latches, requirements on size, single acting type, illustrated. For steel thumb latches, requirements on finish, length of handles and handle plates, thickness of doors to which applicable, illustrated.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Tubular Locks and Latches. For knob latch and cylinder night latch, case of galvanized or cadmium plated steel, 4 and 5 types of each kind, requirements on construction, installation, and operating features.

U. S. Gov., Federal Specifications Board. FF–H–101; 1930. Builders' Hardware, Nontemplate. Unit Type Locks and Latches. For completely factory assembled type slipped into a cut-away in door stile. Knob Latch. Requirements on installation, knobs and escutcheons of cast bronze, dimensions, structural and operating features.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Cast iron. *See* 611.11, 611.21. Cast bronze. *See* 646.41. Zinc coatings and tests. *See* 600.3.

617.23 Lock Parts

American Marine Standards Committee. H No. 61–1930. Locks and Accessories for Ship Doors. Escutcheons and Rosettes. Requirements on thickness of plate and dimensions of escutcheons and rosettes of cast bronze for use with various types of doors, knobs, and ring handles, general design, chemical composition of bronze.

U. S. Gov., Dept. of Commerce. Bureau of Standards, CS22–30; 1930. Builders' Hardware (Nontemplate). Escutcheons. Types and sizes selected and accepted by industry as standard for cast bronze and for wrought designs.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Padlock Eyes. Dimensions of 2 sizes of plate and hole selected and accepted by industry as standard.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Escutcheons, Cylinder Collar, Roses, Key Plates. Requirements on dimensions, general design and construction, and finish for mortise key and mortise cylinder lock escutcheons, collars, roses, and key plates of cast bronze and of wrought bronze, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Padlock Eyes. For galvanized steel plates for screw attachment to doors, with integral eyes for padlocks, requirements on size of plate and of hole.

References.—Knobs and handles. *See also* 617.31, 617.32. Methods of testing, general requirements for metals. *See also* 600.1. Zinc coatings and tests. *See* 600.3. Cast bronze. *See* 646.41.

617.3 KNOBS, HANDLES, AND PULLS

617.31 Door Knobs

American Marine Standards Committee H No. 61–1930. Locks and Accessories for Ship Doors. Knobs. For knob for use against metal surface without escutcheon plate or rosette and for knob for use with escutcheon plate or rosette, requirements on general design, dimensions and chemical composition of cast bronze used.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware, Nontemplate. Door Knobs. Types selected and accepted by industry as standard with sizes, shapes, and finishes for brass, bronze, steel, porcelain, jet, and glass door knobs.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Glass Door Knobs, Metal Door Knobs, Pottery Door Knobs. Requirements on shape, dimensions, finish, size of steel spindle, material of shank, metal knobs of cast bronze and of wrought bronze, pottery knobs of white porcelain.

617.32 Door and Drawer Handles

American Marine Standards Committee H No. 61–1930. Locks and Accessories for Ship Doors. Handles. For cast bronze ring handles for doors in place of knobs, covering ring handles with socket and ring handles with spindle, for use with escutcheon plate or rosette and for use without escutcheon plate or rosette, requirements on dimension, general design, and chemical composition of bronze.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Entrance door handles. Types and sizes selected and accepted by industry as standard for cast bronze designs.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Handles. Types and sizes selected and accepted by industry as standard, materials used, for drawer handles with drop bails, flush rings, lifting handles, and trapdoor handles.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Entrance Door Handles. For handles on plates with thumb piece for latch, requirements on dimensions of wrought bronze or cast iron plates and handles, dimensions of cast bronze plates for sectional trim type, illustrated. Specifications for dummy trim.

References.—Door locks and handles for automobiles. *See* 722.33. Methods of testing, general requirements for metals. *See also* 600.1. Cast bronze. *See* 646.41. Door and drawer pulls. *See* 617.33.

617.33 Door and Drawer Pulls

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Door Pulls and Drawer Pulls. Types and sizes selected and accepted by industry as standard.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Door Pulls. For door pulls on plate, sectional door pulls with round bases, ordinary 2-screw and 4-screw door pulls, materials cast and wrought bronze with steel also for the 2-screw type requirements on main dimensions, general design and finish, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Knob Pulls, Drawer Pulls. For cast bronze knob pull, minimum permissible diameter. For steel and bronze types of cup pattern drawer pulls, requirements on size, finish, and general design and metal thickness for wrought bronze type. For cast bronze bar pattern drawer pull, requirements on size and design.

References.—Cast bronze. *See* 646.41. Cast iron. *See* 611.11, 611.21. Door and drawer handles. *See* 617.32.

617.34 Push and Kick Plates and Bars

U. S. Gov., Dept. of Commerce Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Push Bars. Sizes of bars selected and accepted by industry as standard.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Push Plates. Types and sizes of plain cast bronze push plates selected and accepted by industry as standard.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Push Bars. For single bar vertical type and for multiple bar types, bases and brackets of cast bronze, rods of tubing or solid material, requirements on dimensions, general design, installation, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Push Plates. Rrequirements on dimensions, general design, and finish for cast bronze, wrought bronze, and plate glass push plates.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Kick Plates. Material wrought bronze, requirements on thickness of plate and general design, illustrated.

References.—Cast bronze. *See* 646.41. Bronze plates and sheets. *See* 646.21. Bronze bars and rods. *See* 646.12, 646.31.

617.35 Sash Lifts

American Marine Standards Committee H No. 63–1930. Sash Hardware for Ships. Sash lifts. For 2 types of cast bronze flush sash lifts and for 1 type of cast bronze and 1 type of cast or wrought bronze hook sash lifts, requirements on general design, main dimensions, and chemical composition of bronze.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Sash Lifts. Sizes selected and accepted by industry as standard for flush and bar types, materials steel, bronze, iron.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Hook Sash Lifts, Flush Sash Lifts, Bar Sash Lifts, Screen Lifts. Requirements on finish, size, and thickness of metal for bronze and steel types of hook sash lifts, on finish, size, and general design of flush sash lifts of bronze and steel, on size and weight of cast bronze bar sash lifts, and on length of brass and steel screen lifts.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Cast bronze. *See* 646.41.

617.4 CHECKS, CATCHES, AND FASTENERS

617.41 Door Closers and Checks

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Door Closers. For overhead type, single acting, combined spring and liquid check, requirements on adjustibility of spring, permissible acidity, viscosity, pour point of liquid, general construction and material of parts, case of cast bronze, other types of cast iron, 7 sizes and types of doors to which applicable.

References.—Cast bronze. *See* 646.41. Cast iron. *See* 611.11. Cast brass. *See* 645.21. Checking floor hinges. *See* 617.12.

617.42 Catches

American Marine Standards Committee H No. 62–1930. Bolts and Catches for Ship Doors. Elbow catch. For one size of cast bronze catch, requirements on general design, main dimensions, and chemical composition of bronze.

American Marine Standards Committee H No. 62–1930. Bolts and Catches for Ship Doors. Turn catch for cupboard and locker doors. For one standard size of cast bronze turn, requirements on general design and controlling dimensions, and on chemical composition of bronze.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Catches. Sizes and types selected and accepted by industry as standard for steel, iron, brass, and bronze catches for screen doors, cupboards, and transoms.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Elbow Catches. For plated cast iron and brass types, requirements on sizes.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Transom Catches. For bronze, steel, and iron types, requirements on dimensions, thickness of case, and finish, illustrated.

References.—See references under 617.41.

617.43 Door, Casement, and Sash Fasteners

American Marine Standards Committee H No. 63–1930. Sash Hardware for Ships. Hook sash fastener. For one type and size, requirements on general design and main dimensions, chemical composition of cast bronze used.

American Marine Standards Committee H No. 63–1930. Sash Hardware for Ships. Meeting rail sash lock. For bronze sash fastener of rotating cam type, requirements on main dimensions and general design, chemical composition of bronze.

American Marine Standards Committee H No. 63–1930. Sash Hardware for Ships. Pawl sash catch. For right or left hand cast bronze fastener with one or more ratchet stops, requirements on general design, main dimensions, and chemical composition of bronze.

American Marine Standards Committee H No. 63–1930. Sash Hardware for Ships. Spring bolt sash fastener. For right-hand or left-hand fastener with one or more stops, made of bronze, requirements on main dimensions, general design, and chemical composition of bronze.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Fasteners for door, casement, and sash. Types and sizes selected and accepted by industry as standard, materials of parts.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Casement Fasteners, Cellar Window Fasteners, and Sash Fasteners. Requirements on main dimensions and finish for cast iron and cast bronze types of casement fasteners, for a cast iron type and a steel type of cellar window fastener, and for cast bronze and cast iron crescent type and cast bronze car window types of sash fasteners.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Door Fasteners, With Chain. For wrought bronze, wrought steel, cast bronze, and cast iron types, requirements on length of plates and finish, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Fasteners for Blinds. Turnbuckles for Blinds. For steel double acting gravity type of hook fastener, for rod type of combined fastener and holder, and for S pattern of steel turnbuckle type of holder, requirements on sizes, materials, finish, operating features and general design for frame and brick applications, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Scuttle Fasteners. For galvanized wrought iron type, requirements on main dimensions, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Window Screen Fastener. Galvanized, 10-inch size, to hold screen open or closed, illustrated.

References.—See references under 617.41. Chain for fasteners. *See also* 603.56.

617.44 Door Holders and Stops

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders Hardware (Nontemplate). Door Holders. Types and sizes selected and accepted by industry as standard, materials cast iron and bronze.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Door Stops. Types, sizes, and methods of attachment selected and accepted by industry as standard, for wall and floor types, materials steel, iron, and bronze.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Door Holders. For overhead shock absorber type, lever type, floor type with bumper, plunger type, and overhead garage type with chain. Requirements on operating features, general design as illustrated, materials, finish, main dimensions or weight, and sizes, lever type of cast bronze, plunger type with bronze, iron, and steel type cases.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Door Stops. Includes wall types and floor types with rubber tips, with and without hook and keeper, wall types of cast bronze, cast iron, and wood, with screw point and screw attachment plates, floor types of cast bronze, requirements on main dimensions and number of screws, illustrated.

References.—See references under 617.41.

617.5 TRANSOM AND SASH DEVICES

American Marine Standards Committee H No. 63–1930. Sash Hardware for Ships. Antirattlers. For cam type, right or left hand, and for screw type, requirements on general design, main dimensions, and chemical composition of bronze.

American Marine Standards Committee H No. 63–1930. Sash Hardware for Ships. Sash pivots. For straight type and for offset type of cast bronze pivot for sash, requirements on general design, main dimensions, and chemical composition of bronze.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Casement Adjusters. Types and sizes selected and accepted by industry as standard for steel, cast iron, and bronze adjusters.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Pulleys. Includes sash pulleys. Types, sizes and kinds of finish selected and accepted by industry as standard.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Sash or Transom Pivots. Types and sizes selected and accepted by industry as standard with type of finish and material specified in several of the types.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Sash rollers, sash sheaves, shutter sheaves. Types and sizes selected and accepted by industry as standard, materials iron, brass, steel, and cast iron for shutter sheaves.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Transom Chains. Types selected and accepted by industry as standard, with type of plate and material of and length of chain.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Transom Lifters. Sizes and lengths of rods selected and accepted by industry as standard, materials steel and bronze, for various types of transoms.

U. S. Gov., Federal Specifications Board 348; 1925. Standard Miscellaneous Chain and Attachments. Sash Attachments. Dimensions of illustrated steel wire attachment to weight, sheet steel socket attachment to sash, and steel wire attachment to socket.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Casement Adjusters. Requirements on lengths and sizes of rods and bases, operation features, for inswinging and for outswinging casements, of bronze, cast iron, and steel, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Sash Cord Irons. For attaching end of sash cord to sash, of cast iron, requirements on length, type of screw, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Sash Operators. For vertically pivoted sash, requirements on general design, size and length of rods, for bronze and steel types, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Sash or Transom Pivots. For cast iron full mortise types, cast bronze and cast iron rabbeted types, cast bronze and malleable iron friction types, requirements on dimensions and finish, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Sash Pulleys. Requirements on sizes of wheel, dimensions, and thickness of front plate for 3 sizes of pulleys, for various types with steel or iron wheels and cases, brass wheels with iron cases, etc., plain and ball bearing types, round groove and combination groove for cord or chain, required thickness of sheet metal and shafts.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Sash Weights. For round and square types of cast iron and cast lead types, requirements on exterior finish.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Transom Chains. For steel type and for bronze type, requirements on length of plate, thickness of metal in chain, chain according to F. S. B. spec. RR–C–271, type of finish, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Transom Lifters. To have automatic grip, for bronze and plated steel types, various types for bottom hung and top hung sash, opening out and opening in sash, etc., requirements on sizes and lengths of rods, provision of spring, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Transom operators. For heavy sash horizontally pivoted or hinged, hand crank and miter gear type of operator, requirements on self-locking feature, diameter and weight of steel rods, brackets of cast iron.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Window Stop Adjusters. For flat adjustable steel washer type and for cup type adjustable bronze washer, requirements on size of round head screw.

References.—Sash pull plates. *See* 617.11. Sash lifts. *See* 617.35. Sash chains. *See also* 603.56. Window spring bolts. *See* 617.61. Sash fasteners. *See* 617.43. Transom catches. *See* 617.42. Sash pulleys. *See also* 617.9. Transom eyes. *See* 617.11.

617.6 BOLT LOCKS, BRACKETS, AND HOOKS

617.61 Bolt Locks

American Marine Standards Committee H No. 62–1930. Bolts and Catches for Ship Doors. For 2 and 3 standard sizes of each of barrel bolts, light straight bolts, heavy straight bolts, light neck bolts, heavy neck bolts, light flush bolts, heavy flush bolts, and for 1 standard size of spring bolt, all of cast bronze, requirements on controlling dimensions, general design, and composition of bronze.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Bolts. Types and sizes selected and accepted by industry as standard, with materials of parts, for barrel bolts, chain bolts, cremone bolts, cupboard bolts, espagnolette, flat, flush, extension flush, lever flush, extension lever flush, foot, lavatory door, mortise, neck, shutter, and surface bolts.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Barrel Bolts. For wrought steel bolts, plated and galvanized types, for japanned steel bolts, for wrought brass bolts and for cast bronze bolts, requirements on bolt length and thickness of plate in steel bolts, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Chain Bolts. For round or square case bolts of steel, cast bronze, or cast iron, requirements on type of protective coating, length of bolt, thickness of plate for steel bolts, illustrated, 3 standard lengths.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Cremone Bolts, Espagnolette Bolts. For bronze, iron, and steel types of cremone bolts, for ordinary use and extra heavy for garage use, espagnolette bolts of steel for garage use, requirements on sizes of rods, knobs, and handles, finish, operating features, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Exit Bolt Locks. For locks operated from inside of building by slight push or pull on bar, requirements on general design of bronze exit bolts of top and bottom locking type and of side latching type, sizes of cross bar and rods, design and operating features of lock for side latching type, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Flush Bolts, Extension Flush Bolts, Lever Flush Bolts, Extension-Lever Flush Bolts. Bolts for locking top of door, steel, iron, and bronze types, requirements on dimensions of face plate and bolt, standard sizes, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Foot Bolts. For 3 general types of bolts for fastening bottom of door, 2 and 3 sizes of each type, cast-bronze, cast-iron, and wrought-steel types, requirements on main dimension, finish, operating features, thickness of plate in steel types, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Lavatory Door Bolts. For swinging flat lever type and for turn button bolt type, cast bronze and nickel bronze types, requirements on material, main dimensions, and finish, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Mortise Bolts, Neck Bolts, Square Bolts, Surface Bolts. Bolts of brass type and of steel type except surface bolts which are of wrought bronze, requirements on main dimensions, sizes, thickness of metal in steel types, finish, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Window Spring Bolt. Requirements on materials and finish for iron or steel bolt with spring, for sash ⅞ to 1⅞ inches wide.

References.—Cast brass. *See* 645.21. Cast bronze. *See* 646.41. Cast iron. *See* 611.11, 611.21. Nickel plating and zinc coatings. *See also* 600.3. Nickel bronze. *See* 655.3.

617.62 Brackets, Handrail and Shelf

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware, Nontemplate. Handrail Brackets. Commercial standard selected and accepted by industry for 6 types of handrail brackets, steel, cast-iron, cast-bronze and cast-brass construction, and for various methods of attachment, requirements on main dimensions.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware, Nontemplate. Pole Brackets. Commercial standard selected and accepted by industry for cast-iron brackets for 1½-inch poles, including one type for two poles at same height. Brackets support poles to which coat and hat hooks are attached.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware, Nontemplate. Shelf Brackets, Shelf Rests. Commercial standards selected and accepted by industry. For shelf brackets, requirements on main dimensions of 10 sizes of wrought steel brackets with corrugated braces and embossed plates. For wrought or cast-iron shelf rests, standard diameter of milled pin.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Handrail Brackets. For cast-bronze and cast-iron types, requirements on projection distance, finish, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Shelf Brackets. For shelf brackets of sheet steel, requirements on dimension, on sizes of screws, thickness of metal, for 6 bracket sizes, plated, galvanized, and japanned types, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Shelf Rests. For cast-iron pin type of rest for inserting in holes in bookcase end pieces, requirement on size of pin.

References.—*See* references under 617.61.

617.63 Hooks

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Hooks. Types and sizes selected and accepted by industry as standard, materials cast iron and bronze, number of prongs and number of screws specified for baggage hooks, ceiling, display, coat and hat hooks, clothesline hooks, harness, school house, store rack, toilet, and towel hooks.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Coat Hook. For cast brass coat hook, dimensions, chemical composition of brass, nickel plating requirements and tests.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Ceiling Hooks, Coat and Hat Hooks. Clothing hooks, of cast-bronze and cast-iron screw attached type, and steel wire screw point types, requirements on projection distance, number of screws for screw attached types.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Door Hooks, Hooks and Eyes. For cast bronze door hooks, screw attached type and expansion bolt type, requirements on length. For brass wire and steel wire types of hooks and eyes, requirements on lengths and finish. For cast bronze cabin door hooks, screw attached, requirements on lengths.

References.—*See* references under 617.61.

617.7 PLUMBING FIXTURES

617.71 Vitreous and Porcelain Ware

References.—Plumbing practice and symbols. *See also* 600.6. Porcelain and vitreous ware tubs, sinks, lavatories, and water closets. *See* 532.23. Metal and cast iron bath tubs, lavatories and sinks. *See* 612.21, 612.23.

617.72 Slate, Soapstone, Marble, and Glass Plumbing

References.—Plumbing practice and symbols. *See also* 600.6. Slate laundry trays, sinks, water-closet and bath inclosures, slop hoppers, urinals. *See* 511.52. Marble water-closet and bath inclosures. *See* 511.3. Soapstone inclosures. *See* 511.6. Glass inclosures. *See* 521.8.

617.73 Plumbing Trimmings and Fittings

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Quality and dimensional requirements for vitreous and porcelain ware, enameled ironware, supports and fastenings, trimmings and fittings, stops, cocks, flushing valves, roof drains, pipe coverings, piping, valves, etc. For more detailed descriptions see items under references in 617.71–617.75.

References.—Plumbing practice and symbols. *See* 600.6. Pipe fittings. *See* 607.14, 607.2, 607.3, 607.4. Valves and cocks. *See* 607.6. Iron floor drains and traps. *See* 611.14. Iron roof drains. *See* 611.19. Brass drains and traps. *See* 645.4. Brass water closet floor flanges. *See* 645.4. Trimmings for water-closet inclosures and bath rooms. *See* 645.4. Floor, wall, and ceiling plates. *See* 645.4. Seats and seat hinges for water-closet bowls. *See* 532.23.

617.74 Plumbing Stop Cocks and Valves

References.—Plumbing practice and symbols. *See* 600.6. Valves and cocks. *See* 607.6, 645.4.

617.75 Pipe and Pipe Covering, Plumbing

References.—Plumbing practice and symbols. *See* 600.6. Cast-iron pipe. *See* 607.11, 607.12. Malleable iron, wrought iron, and steel pipe. *See* 607.2, 607.3, 607.4. Eaves troughs. *See* 607.5, 642.9. Copper pipe, brass pipe. *See* 642.23, 645.23. Concrete pipe, vitrified clay pipe. *See* 518.67, 531.5. Heating and ventilating equipment. *See* 792. House heating boilers and radiators. *See* 614.4. Pipe coverings. *See* 707.4.

617.79 Miscellaneous Plumbing Fixtures

U. S. Gov., Dept. of Commerce, Bureau of Standards R101–29; 1929. Metal Partitions for Toilets and Showers. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes of partitions, fronts, doors, and posts for metal toilet and dressing room inclosures, recommended dimensions of inclosures.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Shower Fixtures. Main dimensions and materials of supply pipes, valves, sprinkler head and perforations, curtain frame, and duck curtain, one outfit for use over bath tubs and two outfits for shower bath inclosures, with floor drains. Metal parts of nickel plated brass.

References.—Plumbing practice and symbols. *See* 600.6. Nickel plating. *See also* 600.3. Iron and steel sheets and plates. *See* 604.2, 604.1.

617.9 MISCELLANEOUS BUILDERS AND FURNITURE HARDWARE

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Cupboard Turns. Types and sizes selected and accepted by industry as standard.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Door Buttons. Sizes selected and accepted by industry as standard for iron, steel, and brass door buttons.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Letter Box Plates. Types and sizes selected and accepted by industry as standard, material bronze, steel, iron.

U. S. Gov., Dept. of Commerce, Bureau of Standards (CS22–30; 1930. Builders' Hardware (Nontemplate). Pulleys. Types, sizes, and kinds of finish selected and accepted by industry as standard for awning pulleys, ceiling pulleys, clothes line, dumb waiter, hothouse, sash, screw, side, incased swivel, upright, and wagon brake pulleys.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Shutter Bars. For bar and hood types, sizes and types selected and accepted by industry as standard, materials brass and steel.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS22–30; 1930. Builders' Hardware (Nontemplate). Sliding Door Rails. Types and sizes selected and accepted by industry as standard, materials brass, steel and brass.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Clothes-Hanger Bar. Telescoping steel tubing for clothes closets, requirements on finish, thickness of metal, degree of adjustability of different lengths, provision of metal wall plates.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Cupboard Turns. For cast-bronze, wrought-bronze, cast-iron, and wrought-steel types, requirements on finish, dimensions, thickness of plate, shape of knob, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Door Buttons. For galvanized cast iron or wrought steel door buttons, requirements on length for 2 sizes.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Scuttle Operators. For heavy scuttles, worm gear type operator with endless chain and sprocket wheel, requirements on general design, material of arms, bearings, and brackets, finish of parts, illustrated.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware Nontemplate. Skylight Operators. For lifting rod operated by single cord, self-locking, requirements on size of cord, finish and size of lift rod or rods, amount of lift, illustrated.

619. MISCELLANEOUS IRON AND STEEL MANUFACTURES

619.1 FIREARMS AND ORDNANCE

U. S. Gov., Dept. of Commerce. Bureau of Standards R31–31; 1931. Loaded Paper Shot Shells. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes and varieties of paper shot shells for various gages, including black powder loads, smokeless powder loads, brush loads, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards R62; 1927. Metallic Cartridges. Simplified practice recommended and accepted by industry establishing a limited list of types and varieties of metallic cartridges, such as black, semismokeless, smokeless ungreased, smokeless greased, etc., for rim fire cartridges (ball, shot, and blank), center-fire pistol and rifle cartridges.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Line Carrying Guns for ocean vessels. For cast bronze guns of cannon type, and for steel guns of cannon type, mandatory requirements on tensile test of material, on line carrying capacity and method of testing.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Service Projectile Lines and Projectiles. For line carrying guns on ocean vessels, mandatory requirements on length and strength of line, minimum weight and permissible windage of projectile, ease of removal of projectile from gun, recommended size of powder charge, etc.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Cast bronze. *See also* 646.41. Forged steel. *See* 611.51. Cartridge brass. *See* 644.21, 645.9. Explosives. *See* 862, 863. Flax shot line. *See also* 331.21.

619.2 MANUFACTURES OF SHEET IRON AND SHEET STEEL

American Automobile Assn. 1929 Catalogue. Warning, Route, Speed, Etc., Signs. Shape, sizes, colors of standard enameled sheet iron signs.

American Electric Railway Engr. Assn. Recommended Specification D102–29; 1929. Overhead Line Material for Direct and Catenary Suspension. Includes trolley wire supporting bracket arms of pipe or tubing construction, sheet steel guy plates and hub guards, and thimbles for guy cable. Steel according to A. S. T. M. spec. A–9 for structural steel for buildings, requirements on dimensions and variations.

American Society for Testing Materials. D 310–31; 1931. Method of Test for Size of Anthracite. Includes specifications for test screens of metal plates with round openings, requirements on size of openings, general construction of screen for various coal sizes.

American Society for Testing Materials. Tentative Definition E 13–28T; 1928. Definition of the Term Screen (Sieve). Covers plate, sheet, or woven cloth types.

National Assn. of Sheet Metal Contractors. Standard Practice in Sheet Metal Work; 1929. A compilation of drawings with descriptive items of standard construction and typical designs for sheet metal structural items, covering roofing, gutters, conductors, flashings, corrugated iron work, skylights, ventilators, metal cornices, metal ceilings, warm air furnaces, heating and ventilating systems, blow pipe and exhaust systems, fire door and kalamein doors, hollow metal doors and trim, hollow metal windows, restaurant, kitchen and hotel equipment, protective coatings and paints, a total of 356 drawings.

References.—Iron and steel sheets and plates. *See* 604.2, 604.1. Steel desks, lockers and cupboards, and office filing furniture. *See* 613.4, 613.5, 613.7. Stoves, ranges, house heating furnaces. *See* 614. Metal partitions for shower inclosures. *See* 617.79. Switchboard panels of sheet steel. *See* 714.4. Raceways of sheet iron or steel for electric wire. *See* 715.11. Switch boxes and cabinets. *See* 715.12. Electric signs. *See* 716.39. Metal barrels, drums, tubs, kits, pails. *See* 951. Metal cases, metal cans. *See* 954.21, 959.1. Metal tanks. *See* 956.2, 726.1, 605.23. Acetylene generators. *See* 997.5. Illuminating torch, sheet steel. *See* 997.1. Sheet metal hollow ware. *See* 612.20.

619.3 SCREW POSTS, METAL FENCE POSTS

American Railway Engineering Assn. 1929 Manual. Metal Fence Posts; 1928. Of steel or wrought iron, tensile strength, flexure test and bend test requirements, variations in dimensions, amount of zinc coatings, and general design requirements.

References.—Methods of testing and general requirements for metals. *See also* 600.1. Zinc coatings and tests. *See also* 600.3. Wooden fence posts. *See* 401.2.

619.4 BUOYS OF IRON OR STEEL

619.5 WATER FILTERS

American Water Works Assn. Water Works Practice Manual; 1925. Pressure Water Filters, Specifications. Permissible rates of filtration dependent on use of water, requirements on dimensions and capacities for filters and pipe connections and minimum wash water for various filtration rates, required thickness of shell and head for various working pressures for vertical steel and cast-iron filters.

Associated Mfrs. of Water Purifying Equipment. Pressure Water Filters. Undated. Requirements on rates of filtration for water for various uses, dimensions of vertical and horizontal filters and pipe connections for various rates of filtration, thickness of shell and head and dishing of head for various working pressures for steel and for cast iron filters, strength of materials.

619.9 MANUFACTURES OF IRON OR STEEL NOT COVERED IN ABOVE CLASSIFICATION

American Electric Railway Engr. Assn. Recommended Specification D102–29; 1929. Overhead Line Material for Direct and Catenary Suspension. Includes angle iron cross arm braces, guy clamps, guy hooks, over support rods, pole bands, and pole steps. Material steel according to A. S. T. M. spec. A–9 for structural steel for buildings, requirements on construction, dimensions and permissible variations.

American Marine Standards Committee. H No. 3–1925. Fixed Lights for Ships, Type A, Pressed Steel Frame. Dimensions of frame, sizes of bolt holes and bolts, sizes of glass, for 3 standard sizes of fixed lights.

American Marine Standards Committee. H No. 12–1926. Thimbles for Manila Rope. For wrought steel thimbles, dimensions and design for 20 standard sizes for ⅜ to 2⅝ inch size rope.

620–629 FERRO-ALLOYING ORES, METALS, AND METAL MANUFACTURES

621. FERRO-ALLOYING ORES AND METALS

621.1 ORES, FERRO-ALLOYING

621.11 Chrome Ores

American Society for Testing Materials. C 18–21; 1921. Methods of Ultimate Chemical Analysis of Refractory Materials, Including Chrome Ores and Chrome Brick. Preparation and strength requirements for reagents, determination of moisture, percentage of silica, alumina, iron oxide, titania, lime, magnesia, alkalies, and chromium.

U. S. Gov., Federal Specifications Board 125; 1924. Ground Chrome Ore. For one grade fine enough to use as a refractory for open hearth furnaces, requirement on percentage of chromic oxide.

References.—Iron ore. *See* 601.1.

621.12 Manganese Ores

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl. 1927. Standard Samples. Manganese Ore. Sample No. 25b prepared and sold by the bureau with a certificate giving percentage manganese and available oxygen, for use by industrial organizations and others as a comparison standard in checking the accuracy of analysis of manganese ores, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards C26; 1921. Analyzed Iron and Manganese Ores, Methods of Analysis. With special reference to standard samples Nos. 25b, 26, 27a, 28, and 29 of iron ores, the methods used by the bureau are given for mixing and drying of material, for determination of silica, phosphorus, sulphur, aluminum, titanium, vanadium, iron, etc., standardization of permanganate solutions.

U. S. Gov., Federal Specifications Board 142; 1924. Manganese Ore. For one grade of ore consisting of pyrolusite or psilomelane, requirements on minimum percentage of manganese.

References.—Iron ore. *See* 601.1.

621.13 Silicon Ores

621.2 FERRO-ALLOYS

621.20 General Items

American Society for Testing Materials. A 103–27; 1927. Standard Methods of Sampling Ferro-Alloys. Sampling methods for (*a*) ferro-silicon, high carbon ferro-manganese and silico-manganese, (*b*) high carbon ferro-chromium, chromium metal, low carbon ferro-manganese and manganese metal, (*c*) low carbon ferro-chromium, specifications for mortar and pestle.

American Society for Testing Materials. A 104–27; 1927. Standard Methods of Chemical Analysis of Ferro-Alloys. Determination of silicon, manganese, carbon, phosphorus, sulphur, chromium, vanadium, aluminum, tungsten, for the various alloys, method depending on the alloy being analyzed.

621.21 Ferrochrome

American Society for Testing Materials. A 101–27; 1927. Ferro-Chromium. Chemical composition requirements for four grades of material, recommendation for use of A. S. T. M. standard methods of sampling and chemical analysis for ferro-alloys, A 103 and A 104.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Ferrochromium. Sample No. 64 for high carbon ferrochromium, prepared and sold by the bureau with a certificate of analysis, for use by industry and others as a comparison standard for checking the accuracy of analyses of similar products, etc. Average analysis shown in supplement to C25.

U. S. Gov., Federal Specifications Board 139; 1924. Ferro-Chrome. For lump material, chemical composition requirements for 4 grades dependent on carbon content.

References.—Methods of sampling and testing and general requirements for metals. *See also* 600.1, 621.20. Pig iron. *See* 601.2.

621.22 Ferromanganese, Spiegeleisen

American Society for Testing Materials A 98–27; 1927. Spiegeleisen. Chemical composition requirements, with recommendation for use of A. S. T. M. standard methods of sampling and chemical analysis, A 103 and A 104.

American Society for Testing Materials A 99–27; 1927. Ferro-Manganese. Chemical composition requirements, with recommendation for use of A. S. T. M. standard methods of sampling and chemical analysis for ferro alloys, A 103 and A 104.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Ferromanganese. Sample No. 66 for spiegeleisen, No. 67 for manganese metal, and No. 68 for ferromanganese, prepared and sold by the bureau with a certificate of analysis in each case, for use in industry and by others as a comparison standard for checking the accuracy of analyses of similar materials, etc. Averaged analyses shown in supplement to C 25.

U. S. Gov., Federal Specifications Board QQ–F–161; 1931. Ferro-Manganese. Chemical composition requirements for 2 grades, furnished in pigs, crushed in screen sizes, or lumps. Grade A is known as pure carbon-free manganese metal.

U. S. Gov., Federal Specifications Board 273; 1925. Spiegeleisen. Chemical composition of 2 grades of manganese alloy furnished in pigs or lumps.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.20. Pig iron. *See* 601.2. Manganese ores. *See* 621.12.

621.23 Ferromolybdenum

U. S. Gov., Federal Specifications Board 143; 1924. Ferro-Molybdenum. Chemical composition requirements for one grade.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.20. Pig iron. *See* 601.2.

621.24 Ferrosilicon

American Society for Testing Materials A 100–27; 1927. Ferro-Silicon. Chemical composition requirements for three grades of material, with recommendation for use of A. S. T. M. standard methods of sampling and chemical analysis of ferro-alloys, Nos. A 103 and A 104.

U. S. Gov., Dept of Commerce, Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Ferrosilicon. Sample No. 57 for refined silicon, No. 58 for 75 per cent silicon, and No. 59 for 50 per cent silicon, prepared and sold by the bureau with a certificate of analysis in each case, for use by industrial organizations and others as a comparison standard for checking the accuracy of analyses of similar materials, etc. Averaged analyses shown in above-mentioned supplement.

U. S. Gov., Federal Specifications Board. 145; 1924. Ferro-Silicon. Silicon content for 3 grades of ferro-silicon, methods of sampling.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.20. Pig iron. *See* 601.2.

621.25 Ferrotungsten

U. S. Gov., Dept. of Commerce, Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Ferrotungsten. Sample No. 75 prepared and sold by the bureau with a certificate of analysis, for use in industry and by others as a comparison standard in checking the accuracy of analyses of similar materials, etc. Average analysis shown in supplement to C25.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.20. Pig iron. *See* 601.2. Tungsten powder. *See* 696.

621.26 Ferrotitanium, Ferrouranium, Ferrovanadium

American Society for Testing Materials A 102–27; 1927. Ferro-Vanadium. Chemical composition requirements for four grades of material, recommendation for use of A. S. T. M. standard methods of sampling and chemical analysis for ferro-alloys, A 103 and A 104.

U. S. Gov., Dept. of Commerce, Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Ferrovanadium (high carbon). Sample No. 61 prepared and sold by the bureau with a certificate of analysis, for use by industry and others as a comparison standard for checking the accuracy of analyses of similar material, etc. Average analysis shown in supplement to C25.

U. S. Gov., Federal Specifications Board 135; 1924. Ferro-Vanadium. Chemical composition requirements for 2 grades, furnished in lumps.

U. S. Gov., Federal Specifications Board 144; 1924. Ferro-Titanium. Chemical composition requirements for 2 grades.

References.—Methods of testing, general requirements for metals. *See* 600.1, 621.20. Pig iron. *See* 601.2.

621.27 Ferrophosphorus

U. S. Gov., Dept. of Commerce, Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Ferrophosphorus. Sample No. 90 prepared and sold by the bureau with a certificate showing the percentage of phosphorus, for use in industry and by others as a comparison standard in checking the accuracy of analyses of similar materials, etc. Average content of phosphorus shown in supplement to C25.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.20. Pig iron. *See* 601.2.

621.3 CRUDE AND SEMIFINISHED FERRO-ALLOYS

621.30 General Items

American Society for Testing Materials A 8–29; 1929. Structural Nickel Steel. Includes rivet steel, chemical composition, tension, bend, and fracture test requirements.

American Society for Testing Materials A 55–24; 1924. Standard Methods of Chemical Analysis of Alloy Steels. Methods of analysis, reagents required for determination of nickel, manganese, silicon, chromium, phosphorus, vanadium, sulphur, tungsten, cobalt, molybdenum, with reference to A 33–24 analysis of plain carbon steel for determination of carbon, manganese, phosphorus, sulphur, silicon, for the various alloy steels.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Alloy steels. Sample No. 30c for chrome-vanadium steel, No. 32b for chrome-nickel, No. 33b for nickel steel, No. 50a for chrome-tungsten-vanadium, No. 72 for chrome-molybdenum, and No. 73 for stainless steel, as prepared and sold by the bureau with a certificate of analysis in each case, for use by industrial organizations and others as a comparison standard for checking the accuracy of analyses of similar steels, etc. Averaged analyses of samples shown in supplement to C 25.

621.31 Ferro-alloy Billets, Bars, and Rods

American Railway Assn. Mechanical Div. Recommended Practice; 1929. High Chrome Steel Rivet Material and Rivets for Nitric Acid Tank Cars. For electric furnace steel, requirements on chemical composition, tension tests, bend tests, oil quench bend tests, and permissible variations in diameter of rivet stock bars.

American Society for Testing Materials A 17–29; 1929. Carbon Steel and Alloy Steel Blooms, Billets and Slabs for Forgings. Includes nickel steel, 4 grades of chrome-nickel steel, chrome steel, and chrome-vanadium steel, requirements on reduction from ingot, chemical composition tests and permissible amount of chipping.

Society of Automotive Engineers. 1931 Handbook. Chromium Steels; 1929. Chemical composition requirements for 4 grades, including grades suitable for casehardening, for heat treated automobile forgings, and for balls, rollers, and races of bearings.

Society of Automotive Engineers. 1931 Handbook. Chromium-Vanadium Steels; 1929. Chemical composition requirements for 9 grades, including grades suitable for casehardening, for heat treated forgings and machined parts, and for tool steel.

Society of Automotive Engineers. 1931 Handbook. Molybdenum Steels; 1929. Chemical composition requirements for 4 grades, for heat treated forgings with one grade for casehardening and gears.

Society of Automotive Engineers. 1931 Handbook. Nickel Steels; 1929. Chemical composition requirements for 10 grades, including grades suitable for casehardening and gears, for massive parts to be case hardened, for heat treated parts of strength and toughness, and for large section gears.

Society of Automotive Engineers. 1931 Handbook. Nickel-Chromium Steels; 1929. Chemical composition requirements for 21 grades, including grades for casehardening, structural parts, for heat treated forgings, machined parts, oil hardened parts, gears, etc.

U. S. Gov., Federal Specifications Board 316; 1925. Steel Blooms, Billets, Slabs, and Bars for Reforging, Carbon and Alloy. For 2 grades of nickel steel, 2 grades of nickel chromium steel, one grade of chromium molybdenum steel, and one grade of chromium vanadium steel. General quality requirements, amount of ingot discard, minimum reduction in area in rolling from ingot to billet, sampling, chemical composition, tensile test and cold bend test requirements for above 6 grades of alloy steel and for 4 grades of carbon steel.

U. S. Gov., Federal Specifications Board 372; 1926. Structural Nickel Steel. Grade A, plates, shapes, and bars; grade B, rivet steel; grade C, eye bars and rollers. Chemical composition, tension test, and bend test requirements, permissible variations in dimensions or weight from the ordered quantities.

References.—Tolerances on weight and sizes. *See also* 600.7. Methods of testing, general requirements for metals. *See also* 600.1, 621.30. Heat treatments. *See also* 600.5. Carbon steel billets. *See* 602.2. Carbon steel bars and rods. *See* 603.2, 603.3, 605.1. Alloy steel structural bars, spring stock, tool stock. *See* 621.33, 621.34, 621.35. Alloy steel bolting material. *See* 622.1.

621.32 Ferro-alloy Plates, Sheets, and Strips

American Railway Assn. Mechanical Div. Recommended Practice; 1929. High Chrome Steel Tank Plates for Nitric Acid Tank Cars. For electric furnace steel, requirements on chemical composition, on bend tests, permissible variations in thickness, finish, and method of pickling.

American Society for Testing Materials A 8–29; 1929. Structural Nickel Steel. Includes plates, chemical composition, tension, fracture, bend, and drift test requirements, permissible variations in weight and thickness from specified values.

American Society for Testing Materials A 94–29; 1929. Structural Silicon Steel. Includes plates, chemical composition, tension, and bend test requirements, permissible variations in weight and thickness from quantities specified.

Assn. of American Steel Manufacturers. Standard Permissible Variations in Gage Weight, Gage Thickness, Size, and Flatness of Sheets and Light Plates Blue Annealed; 1929.

U. S. Gov., Federal Specifications Board 372; 1926. Structural Nickel Steel. Grade A, plates, shapes, and bars; grade B, rivet steel; grade C, eye bars and rollers. Chemical composition, tension test, and bend test requirements, permissible variations in dimensions or weight from the ordered quantities.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.30. Heat treatments. *See also* 600.5. Standard thicknesses. *See* 604.0. Carbon steel sheets and plates. *See* 604, 605.1. Alloy steel structural plates. *See also* 621.33.

621.33 Structural Shapes of Ferro-alloys

American Society for Testing Materials A 8–29; 1929. Structural Nickel Steel. Chemical composition, tension, bend, fracture, and drift test requirements, for structural and rivet steel, permissible variations in cross-section and weight, and in thickness of plates, tension test requirements for full size eyebars.

American Society for Testing Materials A 94–29; 1929. Structural Silicon Steel. Chemical composition, tension, and bend-test requirements, permissible variations in cross-section and weight, and in thickness of plates from amounts specified.

American Society for Testing Materials A 113–29; 1929. Structural Steel for Locomotives and Cars. Not including boiler and firebox plates. Chemical composition, tension, and bend-test requirements for structural steel for cars, structural steel for locomotives, plates for cold pressing, and rivet steel, permissible variations in weight and dimensions from quantities specified. 1924 edition of structural steel for cars available in Portuguese from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

Society of Automotive Engineers 1931 Handbook. Nickel Steels; 1929. Chemical composition requirements for 10 grades, including grades suitable for heat treated parts of strength and toughness for automotive uses.

Society of Automotive Engineers 1931 Handbook. Nickel-Chromium Steels; 1929. Chemical composition requirements for 21 grades, including grades for structural and automotive parts.

U. S. Gov., Federal Specifications Board 372; 1926. Structural Nickel Steel. Grade A, plates, shapes, and bars; grade B, rivet steel; grade C, eye bars and rollers. Chemical composition, tension test, and bend-test requirements, permissible variations in dimensions or weight from the ordered quantities.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.30. Standard thicknesses of plates. *See* 604.0. Tolerances on weight and thickness. *See also* 600.7. Carbon structural steel. *See* 605.1.

621.34 Alloy Steel for Springs

American Society for Testing Materials A 59–27; 1927. Silico-Manganese Steel Bars for Railway Springs. Chemical composition and tests, permissible variations in dimensions.

American Society for Testing Materials A 60–27; 1927. Chrome-Vanadium Steel Bars for Railway Springs. Chemical composition and tests, permissible variations in dimensions.

Society of Automotive Engineers 1931. Handbook. Silico-Manganese Steels; 1929. Chemical composition requirements for 2 grades, suitable for springs.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.30. Heat treatments. *See also* 600.5. Tolerances on weight and thickness. *See also* 600.7. Carbon spring steel. *See* 603.33.

621.35 Alloy Steel for Tools

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stock; 1930. Report of committee recommending list of standard sizes to be carried in stock of high speed steel, flat, rounds, and squares.

American Society for Testing Materials A 92–26; 1926. High-Speed Tool Steel. Suitable for lathe and planer tools, milling cutters, drills, etc. Permissible variations from chemical composition specified, methods of sampling, tolerances in dimensions, with an inclusion of recommended practice for the heat treatment of 18 per cent tungsten high-speed steel of the American Society for Steel Treating.

American Society for Testing Materials A 115–28; 1928. Alloy Tool Steel. Permissible variations in chemical compositions agreed upon, methods of sampling, tolerances in dimensions.

Society of Automotive Engineers 1931 Handbook. Chromium-Vanadium Steels; 1929. Chemical composition requirements for 9 grades, including one grade suitable as a tool steel.

Society of Automotive Engineers 1931 Handbook. Tungsten Steels; 1929. Chemical composition requirements for 3 grades.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.30. Heat treatments. *See also* 600.5. Tolerances on weight and thickness. *See also* 600.7. Carbon tool steel. *See* 603.32.

621.36 Alloy Steel for Magnets

References.—Methods of test for magnetic properties. *See* 600.1.

622. MANUFACTURES OF FERRO ALLOYS

622.1 BOLTS, FERRO-ALLOY

American Electric Railway Engr. Assn. Recommended Specification G101–25; 1925. Specification for Alloy Steel Bolting Material for High-Temperature Service. (Identical with A. S. T. M. tentative specification A96–25T.) Material, heat treatment, chemical analysis and tests, tension and hardness tests. (Covers rolled, forged or cold drawn bars and bolts, screws and studs used as bolting material for valves and fittings for temperatures from 400° to 750° F.)

American Electric Railway Engr. Assn. W22–23; 1923. Standard Specification for Quenched, Alloy-Steel Track Bolts. Heat treatment, chemical composition and tests, tension and bend tests, permissible variations in dimensions. Identical in substance with A. S. T. M. specification A51–21.

American Railway Engineering Assn. 1929 Manual. Quenched Carbon Steel and Alloy Steel Track Bolts; 1924. Chemical composition, tensile test and bend test requirements for the bolt, strip test for bolt and nut, permissible variations from drawing dimensions, standard design.

American Society of Mechanical Engineers. Joint sponsor with Heating and Piping Contractors National Assn. and Manufacturers Standardization Society of Valve and Fittings Industry under procedure of American Standards Assn. B 16e–1927. Steel Pipe Flanges and Flanged Fittings. For steam pressures of 250 to 1,350 pounds and hydraulic pressures of 500 to 2,250 pounds. For alloy steel bolting material and forged steel flanges, tension and chemical composition requirements, facing and bolting requirements, inspection limits and tables of dimensions of fittings.

American Society for Testing Materials A 51–21; 1921. Quenched Alloy Steel Track Bolts. Quenching temperature, chemical composition and tests, tension and bend test requirements, permissible variation in dimensions.

American Society for Testing Materials A 96–31; 1931. Alloy Steel Bolting Material for High Temperature Service. Covers rolled, forged or cold-drawn bars, and bolts, screws and studs for valves, flanges and fittings subject to high temperatures, material of nickel, chrome-nickel, chrome-vanadium, chrome-manganese, or other alloy specified. Heat treatment procedure, chemical composition limitations and tests, tension and hardness test requirements.

Society of Automotive Engineers 1931 Handbook. Connecting-Rod Bolts; 1920. Dimensions and hardness test for material, nickel or nickel chromium steel recommended.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Propeller Blade Clamp Rings, Bolts and Nuts, Aeronautic; 1929. Dimensions and design of 2 recommended standard sizes of cadmium plated bolts and nuts, chemical composition, tensile strength, and hardness requirements for permissible types of alloy steel for bolts, composition of carbon steel nuts.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.30. Heat treatment. *See also* 600.5. Tolerances on weight and thickness. *See also* 600.7. Classification of railway materials. *See* 600.2. Carbon steel bolts, track bolts. *See* 608.31. 606.4.

622.2 RAILWAY RAILS, FERRO-ALLOY

American Electric Railway Engr. Assn. Recommended Specification W104–28; 1928. Approved as tentative standard by American Standards Assn. Serial E10–1929. Specification for Materials for Use in the Manufacture of Special Trackwork. Includes rolled manganese steel rails, Chemical composition and physical test requirements, permissible variations in size and location of bolt and bond holes.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.30. Classification of railway materials. *See* 600.2. Track construction. *See* 606.0. Carbon steel rails. *See* 606.1.

622.3 TUBULAR PRODUCTS AND FITTINGS, FERRO-ALLOY

American Railway Assn. Mechanical Div. Recommended Practice; 1929. Seamless High Chrome Steel Tubing for Nitric Acid Tank Cars. For electric furnace steel, requirements on chemical composition, on flattening and bend tests.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.30. Carbon steel tubular goods. *See* 607.4.

622.4 FERRO-ALLOY WIRE AND MANUFACTURES

U. S. Gov., Federal Specifications Board 174; 1924. Welding Wire, Iron and Steel. Includes grade G for a nickel steel gas welding wire. General physical quality and chemical composition requirements.

References.—Electrical resistance wire. *See* 715.43. Methods of testing, general requirements for metals. *See also* 600.1, 621.30. Wire gages. *See* 603.40. Carbon steel wire. *See* 603.41. Welding rod and wire. *See also* 603.26. Fourdrinier wire cloth of stainless steel wire. *Se* 645.39.

622.5 FERRO-ALLOY CASTINGS

American Electric Railway Engr. Assn. W29–27; 1927. Standard Design of Solid Manganese Steel Crossings; Steam Railroad Over Electric Railway for 7-inch and 9-inch Girder Rails. For angles 90° to 60°, inclusive. Plan and sectional drawings with dimensions, for cast manganese steel crossings.

American Electric Railway Engr. Assn. W30–27; 1927. Design of Solid Manganese Steel Crossings; Steam Railroad Over Electric Railway for 7-inch and 9-inch Girder Rails. For angles below 60° to 40°, inclusive. Plan and dimensioned sectional drawings of cast manganese steel crossings, standard designs.

American Electric Railway Engr. Assn. W37–28 and W38–28; 1928. Design of Solid Manganese Steel Crossings; Steam Railroad over Electric Railway. W37 for angles of 90° to 60°, inclusive, and W38 for angles from 60° to 40°, for standard section rails, standard design of crossing, structural features, dimensions and design of various sections.

American Electric Railway Engr. Assn. Recommended Specification W104–28; 1928. Approved by American Standards Assn. as tentative standard E10–1929. Specification for Materials for Use in the Manufacture of Special Trackwork. Includes specifications for manganese steel track castings, their chemical composition requirements and the bend test where specified.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. High Chrome Steel Castings for Valves for Nitric Acid Tank Cars. For electric furnace steel, requirements on chemical composition, on heat treatment, finish, and porosity test.

American Railway Engineering Assn. and Manganese Track Society. A. R. E. A. Trackwork Plans, Appendix B; 1930. Manganese Steel Track Castings. Requirements on chemical composition, bend tests, and permissible kinds and location of defects.

American Society for Testing Materials. Tentative Specifications A128–30T; 1930. Austenitic Manganese Steel Castings. Often referred to as Hadfield's manganese steel, requirements on heat treatment, chemical composition, and (where specified) the bend-test requirements, permissible methods of manufacture.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.30. Heat treatments. *See also* 600.5. Classification of railway materials. *See* 600.2. Railway construction and special track work. *See* 606.0, 606.3. Carbon steel castings. *See* 611.41. Other specifications for cast alloy steel. *See* specifications for individual commodities made of cast alloy steel.

622.6 FERRO-ALLOY FORGINGS

American Railway Assn. Mechanical Division. Axles, Shafts and Other Forgings, Alloy Steel, Quenched and Tempered; 1925. Cover chrome-nickel and chrome-vanadium steel forgings for locomotives. Two classes dependent on type of machine work required, boring, heat treatment, chemical analysis, tensions, bend, and impact test requirements.

American Society for Testing Materials A 18–30; 1930. Carbon Steel and Alloy Steel Forgings. Covers carbon steels of classes A to G, and alloy steels for machinery forgings, classes H to M. Annealing, quenching and tempering procedure, chemical composition and tests, tension test requirements. 1921 edition available in Spanish and Portuguese from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. A 63–27; 1927. Quenched and Tempered Alloy Steel Axles, Shafts, and Other Forgings for Locomotives and Cars. Covers class K for main and side rods, straps, piston rods, class L for driving and trailing truck axles and crank pins. Heat-treatment procedure, phosphorus and sulphur content, tension, bend and impact test requirements. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. Tentative Specifications. A 133–31T; 1931. Normalized and Tempered Alloy Steel Forgings for Locomotives. For 2 grades as regards strength, requirements on heat treatment, chemical composition, tensile tests and elongation, bend tests.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.30. Heat treatments. *See also* 600.5. Classification of railway materials. *See* 600.2. Carbon steel forgings, axles, and shafts. *See* 611.51, 611.52.

622.7 FERRO-ALLOY SPRINGS

References.—Alloy steel stock for springs. *See* 621.34.

622.9 MISCELLANEOUS MANUFACTURES OF ALLOY STEEL

American Electric Railway Engr. Assn. W44–28; 1928. Design of Bolted Manganese Steel Crossings; Steam Railroad over Electric Railway. For angles from 45° to 30°, standard design and construction of crossing with some dimensions.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. High Chrome Steel Rivet Material and Rivets for Nitric Acid Tank Cars. Chemical composition and physical test requirements for bar stock, requirements on temperatures at fabrication, bend tests, and flattening tests for rivets, permissible variations in diameter and size of rivet heads.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS37–31; 1931. Steel Bone Plates and Screws. A commercial standard selected and adopted by industry for Sherman type bone plates made of chromium-vanadium steel, requirements on chemical composition of plates and screws corresponding to S.A.E. steel No. 6150, hardness, dimensions, and design for 14 plate sizes and 11 screw sizes.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 621.30. Heat treatments. *See also* 600.5. Special trackwork. *See also* 606.3. Hack saw blades of alloy steel. *See* 615.62. Measuring gages of alloy steel. *See* 615.82.

630–639 ALUMINUM, ANTIMONY, BISMUTH, CADMIUM, AND COBALT

631. ALUMINUM

631.0 GENERAL ITEMS

American Society for Testing Materials. Tentative Methods B 40–28T; 1928. Methods of Chemical Analysis of Aluminum and Light Aluminum Alloys. For aluminum of not less than 98 per cent aluminum, preparation of reagents and determination of silicon, titanium, iron, copper, and manganese; for light aluminum alloys, determination of silicon, iron, copper, calcium, magnesium, manganese, zinc, nickel.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Aluminum. Sample No. 44b, prepared and sold by the bureau with a certificate giving the melting point, for use in industry and by others as standards for calibrating pyrometers, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards C66; 1917. Standard Samples for Thermometric Fixed Points. Description of preparation of pure samples of aluminum, their chemical analyses, freezing points, and degree of purity, their use for the standardization of thermocouples, pyrometers, etc.

631.1 ALUMINUM ALLOYS, INGOTS, AND BARS

References.—Aluminum bronze. *See* 647.1.

631.11 Alloys, Aluminum

Society of Automotive Engineers 1931 Handbook. Aluminum Alloys; 1930. Chemical composition requirements for 15 aluminum alloys, including duralumin or 17s, and alloys suitable for forgings, castings, rolled parts, types resistant to salt water, shock, etc., information on their tensile properties, dimensions and tolerances when furnished as sheets, shapes, rods, etc., usual uses in automobiles.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 631.0. Other aluminum alloys. *See also* 631.12, 631.23, 631.31, 631.41. Magnesium alloy castings. *See* 695.

631.12 Ingots, Aluminum

American Society for Testing Materials B 24–29; 1929. Aluminum Ingots for Remelting. Covers

3 grades of virgin aluminum, permissible types and amounts of impurities, sampling procedure, tests of chemical composition according to A. S. T. M. method B 40.

American Society for Testing Materials B 37–26; 1926. Aluminum for Use in the Manufacture of Iron and Steel. Chemical composition of two grades of virgin and four grades of secondary aluminum, methods of sampling, in form of ingots, rods, or shot.

American Society for Testing Materials B 58–31; 1931. Aluminum Base Sand Casting Alloys in Ingot Form. Specific gravity not exceeding 3.0, requirements on chemical composition and sampling for 10 alloys. For suitability of various alloys see spec. B 26–31T of A. S. T. M. under 631.41.

U. S. Gov., Federal Specifications Board 134; 1924. Aluminum Ingot. For 2 grades, general quality requirements, chemical composition requirements. Grade A suitable for castings and for rerolling and forging purposes, grade B for deoxidizer and for lower grade castings.

References.—Aluminum alloys. *See also* 631.11. Methods of testing, general requirements for metals. *See also* 600.1, 631.0.

631.13 Bars, Aluminum

References.—Aluminum alloy bars. *See* 631.11.

631.2 ALUMINUM PLATES, SHEETS, SHAPES, AND STRIPS

631.21 Plates, Aluminum

U. S. Gov., Dept. of Commerce, Bureau of Standards C391; 1931. Standard Thicknesses, Weights, and Tolerances of Sheet Metal (Customary Practice). American wire gage for aluminum. Known also as Brown & Sharpe gage as used for sheets and wire, table of gage numbers, thicknesses and weights for sheets and plates, permissible variations in thickness.

References.—Aluminum alloy plates. *See* 631.11. Methods of testing, general requirements for metals. *See also* 600.1, 631.0.

631.22 Shapes, Aluminum

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Body Molding; 1924. Dimensions of aluminum belt molding and of aluminum drip molding for automobile bodies.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Extruded Structural Shapes of Aluminum Alloy, Aeronautic. Section dimensions, moment of inertia, section modulus, area, radius of gyration, and weight per foot for equal and unequal angles, bulb angles, shallow and deep channels, bulb channels, tees, and zees up to 2 and 3 inch sizes.

References.—Aluminum alloy. *See also* 631.11. Methods of testing, general requirements for metals. *See also* 600.1, 631.0.

631.23 Sheets, Aluminum

American Society for Testing Materials. B 25–29; 1929. Aluminum Sheet. Chemical purity, tension and bend test requirements for 3 grades of aluminum sheet dependent on temper, permissible variations from specified dimensions.

American Society for Testing Materials. B78–31; 1931. Aluminum Alloy (Duralumin) Sheet. Requirements on nonuse of scrap material, chemical composition, tension test and bend test for quenched and aged temper grade and for annealed temper grade, permissible variation in thickness from specified amounts.

American Society for Testing Materials B79–31; 1931. Aluminum Manganese Alloy Sheet. Covers flat aluminum alloy (duralumin) sheet, requirements on nonuse of scrap material, chemical composition, tension test and bend test for 3 hardness grades, tolerances on thickness.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Aluminum Body Sheets; 1924. Size and temper requirements for No. 14 gage and No. 16 gage sheets conforming to S. A. E. specifications for aluminum sheet.

Society of Automotive Engineers 1931 Handbook. Aluminum Sheet and Strip; 1930. Chemical composition and tensile test requirements for 4 temper grades, permissible thickness tolerances.

References.—Other aluminum alloy sheet. *See* 631.11. Methods of testing, general requirements for metals. *See also* 600.1, 631.0. Heat treatments. *See also* 600.5. Standard gage and thicknesses for sheets. *See* 631.21.

631.24 Strips, Aluminum

Society of Automotive Engineers 1931 Handbook. Aluminum Sheet and Strip; 1930. Chemical composition and tensile test requirements for 4 temper grades, permissible thickness tolerances.

References.—Aluminum alloy strips. *See also* 631.11. Methods of testing, general requirements for metals. *See also* 600.1, 631.0. Standard gage and thicknesses for strips. *See* 631.21.

631.3 AULMINUM RODS, WIRES, AND RIVETS

631.31 Rods, Aluminum

American Railway Assn. Mechanical Div. Recommended Practice; 1924. Welding Wire and Rods. Includes 2 classes of aluminum rods for gas welding of aluminum, requirements on chemical composition, dimensions and tolerances.

U. S. Gov., Federal Specifications Board 269a; 1929. Nonferrous Welding Rods for Gas Welding. Includes type D, aluminum rods, for general welding of aluminum, general quality and chemical composition requirements, to conform to F. S. B. Spec. 339 for metals.

U. S. Gov., Federal Specifications Board 269a; 1929. Nonferrous Welding Rods for Gas Welding. Includes type E, aluminum alloy rods, for general welding of aluminum-copper alloys, general quality and chemical composition requirements, to conform to F. S. B. Spec. 339 for metals.

References.—Other aluminum alloy rods. *See* 631.11. Welding apparatus and procedure. *See* 767. Methods of testing, general requirements for metals. *See also* 600.1, 631.0.

631.32 Wires, Aluminum

American Electric Railway Engr. Assn. Misc. Methods and Practices D201–10; 1910. Hard Drawn Aluminum Wire Table. Dimensions and resistance, Am. Wire Gage. Same as Bureau of Standards Circular 31, second edition.

American Institute of Electrical Engineers. Standard No. 46; 1927. American Standards Assn. C 11–1927. Hard Drawn Aluminum Conductors. Standard values of resistivity, resistance-temperature coefficient, density, and length-temperature coefficient and explanatory notes.

American Railway Assn. Signal Section 5416; 1916. Aerial Aluminum Cable, Steel Reinforced. One steel core wire and 6 aluminum wires, tensile strength requirements for aluminum wire, for steel wire, and for the cable for different sizes, conductivity requirements for aluminum.

Refercnces.—Aluminum welding wire. *See* 631.31. Electric cables and wire of copper. *See* 715.41, 715.44. Methods of testing, general requirements for metals. *See also* 600.1, 631.0. Aluminum alloys in form of wire. *See* 631.11.

631.33 Rivets, Aluminum

Society of Automotive Engineers 1931 Handbook. Rivets, Aluminum and Aluminum Alloy Types, Aeronautic. For flat head type and button head type, standard dimensions and tolerances for diameters up to ⅝ inch.

631.4 ALUMINUM CASTINGS AND TUBES

631.41 Castings, Aluminum

American Society for Testing Materials. B 26–31; 1931. Aluminum Base Alloy Sand Castings. Specific gravity not exceeding 3, requirements on chemical composition and tensile tests for 10 alloys, including alloys suitable for general casting, automotive castings, pumps, manifolds, pistons, cylinder heads, valve guides, high strength parts for street cars, busses, gas engines, outboard motor parts, marine castings, aircraft cylinder heads and pistons, cooking utensils, architectural castings, radiators, meter cases, etc.

American Society for Testing Materials. Tentative Specifications. B 85–31T; 1931. Aluminum Base Alloy Die Castings. For 7 alloy compositions, requirements on chemical composition, permissible variations in percentages of alloying elements, analysis according to A. S. T. M. method B 40–28T.

Society of Automotive Engineers 1931 Handbook. Aluminum Alloys; 1930. Chemical composition requirements for 15 aluminum alloys, including duralumin or 17s, and alloys suitable for castings, forgings, etc., types resistant to salt water, shock, etc., usual uses in automobile construction.

U. S. Gov., Dept. of Commerce, Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Aluminum base casting-alloy. Sample No. 86 prepared and sold by the bureau with a certificate of analysis, for use in industry and by others as a comparison standard for checking the accuracy of analysis of similar material, etc. Analysis shown in supplement.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 631.0. Ingot metal for castings. *See also* 631.12. Other specifications for aluminum castings. *See* specifications of individual commodities made of cast aluminum.

631.42 Tubes, Aluminum

References.—Aluminum alloys in form of tubes. *See* 631.11.

631.5 ALUMINUM HOLLOW WARE

631.9 MISCELLANEOUS ALUMINUM ARTICLES

U. S. Gov., Federal Specifications Board 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. Aluminum Safety Chain. Sheet metal gage, links per foot, weight, and tensile strength requirements for various sizes.

References.—Propeller blade ends of aluminum alloy. *See* 724.24. Aluminum drums. *See* 951.32. Aluminum chemical compounds. *See* 838. Methods of testing, general requirements for metals. *See also* 600.1, 631.0. Aluminum alloys in form of bolts, nuts, rivets, and screws. *See* 631.11. Aluminum powder for paints. *See* 847.1.

632. ANTIMONY

632.1 GENERAL SPECIFICATIONS FOR ANTIMONY

632.2 ANTIMONY INGOT METAL

632.3 ANTIMONY ALLOYS

References.—Antimony-lead alloys. *See* 651.6, 692, 693.1.

632.4 ANTIMONY COMPOUNDS AND SALTS

References.—Chemical compounds of antimony. *See* 839.31.

633. BISMUTH

633.1 BISMUTH METAL

References.—Chemical compounds of bismuth. *See* 836.

634. CADMIUM

References.—Chemical compounds and medicinals of cadmium. *See* 839.39. Cadmium plating. *See* 600.3.

635. COBALT

635.1 COBALT COMPOUNDS AND SALTS

References.—Chemical compounds of cobalt. *See* 839.32.

640–649 COPPER, BRASS, AND BRONZE

640. GENERAL ITEMS

640.1 THICKNESS TOLERANCES FOR NONFERROUS SHEETS AND STRIPS

Society of Automotive Engineers 1931 Handbook. Wrought Nonferrous Metal Alloys. For bronze and brass sheets and strips, 2 tables give 2 sets of permissible variations in thickness of sheets and strips for various gages and widths.

641. COPPER

641.0 GENERAL ITEMS

American Society for Testing Materials B 34–20; 1920. Approved by American Standards Assn. as K 12–1921. Standard Methods of Battery Assay of Copper. Sampling, assay of electrolytic and low resistance lake copper, assay of low grade or casting copper by one of four methods dependent on composition of the copper.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Copper. Sample No. 45a, prepared and sold by the bureau with a certificate giving the melting point, for use in industry and by others as standards for calibrating pyrometers, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards C66; 1917. Standard Samples for Thermometric Fixed Points. Description of preparation of pure samples of copper, their chemical analyses, freezing points, and degree of purity, their use for the standardization of thermocouples, pyrometers, etc.

641.1 COPPER INGOTS AND BARS

641.11 Ingots and Cast Bars, Copper

American Society for Testing Materials B 4–27; 1927. Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars. Resistivity and purity requirements for low resistance lake or electrical copper and for high resistance copper, dimensions and permissible variations in weight for 200 to 300 pound wire bars.

American Society for Testing Materials B 5–27; 1927. Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, and Ingot Bars. Metal content and resistivity requirements, standard dimensions of 200 to 300 pound wire bars and permissible variation in weight.

American Society for Testing Materials. Tentative Specifications B 72–28T; 1928. Fire Refined Copper Other Than Lake. For use in rolling into sheets and shapes for mechanical purposes, not intended for electrical uses, chemical composition, requirements tested according to A. S. T. M. specifications B 34, permissible variations from specified dimensions and weight.

National Metal Exchange, (Inc.). By-Laws and Rules; 1931. Tenderable Grades of Copper. A list of standard grades of copper which may be delivered against the standard copper contract of the Nat. Metal Exchange, such as prime electrolytic copper, prime lake copper assaying 99.90 per cent, and discount grades such as best selected copper, casting copper, blister copper, etc., with required assay, prime electrolytic copper to be in accordance with spec. B 5–27 of Am. Soc. for Testing Materials.

U. S. Gov., Federal Specifications Board 120; 1924. Ingot Copper. Grade A for manufacture of high-grade bronzes and brasses, grade B for commercial brass, screw pipe fittings, etc. Chemical composition requirements for the 2 grades.

References.—Methods of testing, general requirement for metals. *See* also 600.1, 641.0.

641.12 Rolled Bars, Copper

American Society for Testing Materials B 12–21; 1921. Copper Bars for Locomotive Staybolts. For arsenical and nonarsenical grades, chemical composition, tension, and bend test requirements, permissible variation in diameter.

U. S. Gov., Federal Specifications Board 467; 1927. Copper Rods, Bars, Shapes, Plates, Sheets, and Strips. For one grade of copper, soft and hard. General physical quality requirements, purity, tension test, and bend test requirements, permissible variations in dimensions, for copper bars.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 641.0.

641.2 COPPER PLATES, SHEETS, SHAPES, AND STRIPS

641.21 Plates and Sheets, Copper

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Copper plates and shapes. Requirements on tension test, hot and cold bending test, and hammering test.

American Society for Testing Materials B 11–18; 1918. Copper Plates for Locomotive Fireboxes. Chemical composition, tension and bend test requirements, permissible variations in weight and thickness for arsenical and nonarsenical grades of copper plate.

Society of Automotive Engineers 1931 Handbook. Copper Sheet; 1929. Chemical composition, tensile test, and thickness tolerance requirements for soft and hard copper sheets.

U. S. Gov., Dept. of Commerce, Bureau of Standards C391; 1931. Standard Thicknesses, Weights, and Tolerances of Sheet Metal (Customary Practice). American wire gage for copper. Known also as Brown and Sharpe gage as used for sheets and wire, table of gage numbers, thicknesses and weights for copper sheets and plates, permissible variations in thickness.

U. S. Gov., Federal Specifications Board 467; 1927. Copper Rods, Bars, Shapes, Plates, Sheets, and Strips. For one grade of copper, soft and hard, suitable for making pipes, tubing, shapes, receptacles. General physical quality requirements, purity, tension test, and bend test requirements, permissible variations in dimensions, for copper plates and sheets.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 641.0. Bar for rolling into sheets. *See* 641.11. Thickness tolerances. *See also* 640.1.

641.22 Shapes, Copper

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Copper plates and shapes. Requirements on tension test, hot and cold bending test, and hammering test.

U. S. Gov., Federal Specifications Board. 467; 1927. Copper Rods, Bars, Shapes, Plates, Sheets, and Strips. For one grade of copper, soft and hard, general physical quality requirements, purity, tension test, and bend test requirements, permissible variations in dimensions, for copper shapes.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 641.0. Bars for rolling into shapes. *See* 641.11.

641.23 Strips, Copper

U. S. Gov., Federal Specifications Board. 467; 1927. Copper Rods, Bars, Shapes, Plates, Sheets, and Strips. For one grade of copper, soft and hard, general physical quality requirements, purity, tension test, and bend test requirements, permissible variations in dimensions, for copper strips.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 641.0. Standard gage and thicknesses for copper strips. *See* 641.21.

641.3 COPPER COMPOUNDS AND SALTS

References.—Chemical compounds of copper. *See* 839.33.

642. MANUFACTURES OF COPPER

642.1 COPPER RODS, WIRES, AND SLEEVES

642.11 Rods, Copper

American Society for Testing Materials. B 49–26; 1926. Hot-Rolled Copper Rods for Wire Drawing. Quality to be in accordance with A. S. T. M. specifications for Lake Copper Wire Bars (Serial B–4), or Electrolytic Copper Wire Bars (Serial B–5), tension and resistivity test requirements, dimensions and permissible variations.

U. S. Gov., Federal Specifications Board 269a; 1929. Nonferrous Welding Rods for Gas Welding. Includes type C, copper rods for welding of copper sheets and rods, general quality and chemical composition requirements, to conform to F. S. B. spec. 339 for metals.

U. S. Gov., Federal Specifications Board. 467; 1927. Copper Rods, Bars, Shapes, Plates, Sheets, and Strips. For one grade of copper, soft and hard, general physical quality requirements, purity, tension test, and bend test requirements, permissible variations in dimensions, for copper rods.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 641.0. Bars for rolling into rods. *See* 641.12. Welding apparatus and procedure. *See* 767.

642.12 Wires, Copper

References.—Electric cables, cord, and wire. *See* 715.41, 715.42, 715.44.

642.13 Sleeves, Copper

National Electric Light Assn. Suggested Specifications D 950–28T; 1928. Tentative. Splicing Sleeve. For sleeves of annealed copper tubing, dimensions and thickness for various size wires in single, 7, and 19 strand arrangement.

References.—Copper tubing. *See* 642.24.

642.2 COPPER CASTINGS, FERRULES, PIPES, AND TUBES

642.21 Castings, Copper

References.—Other specifications for copper castings. *See* specifications of individual commodities made of cast copper.

642.22 Ferrules, Copper

642.23 Pipes, Copper

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Pipes. For seamless copper and brass pipe, requirements on tension, flattening, bending, expanding, and hydrostatic test, formula for thickness as determined by working pressure.

American Society for Testing Materials. B 42–24; 1924. Copper Pipe, Standard Sizes. Covers seamless tubes and pipe for plumbing, boiler feed lines, etc. Chemical composition and sampling requirements, tension, bend, flange, and hydrostatic test requirements, table of standard weights and dimensions, permissible variations.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Copper Pipe. For installation on steam vessels, mandatory requirements on thickness of pipe wall as a function of pressure, minimum bend radius of installed pipe.

U. S. Gov., Federal Specifications Board WW-P-378; 1930. Seamless Copper Pipe and Tubing. For pipe of standard iron pipe sizes, requirements on physical appearance, purity of copper, dimensions and weights and permissible variations, hydrostatic test, bending test, hammering test, flanging test, and tension-test requirements.

References.—Copper tubing. *See also* 642.24. Pipe installation and threads, iron or steel pipe. *See also* 607.0. Methods of testing, general requirements for metals. *See also* 600.1, 641.0.

642.24 Tubes, Copper

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Seamless-drawn copper pipes and tubes. Requirements on tension test, flattening test, flanging test, and hydrostatic pressure test.

American Society for Testing Materials. B 13-18; 1918. Seamless Copper Boiler Tubes. For locomotive boilers. For arsenical and nonarsenical grades, chemical composition requirements, methods of sampling, flange, crush and hydrostatic test requirements, standard weights and permissible variations.

American Society for Testing Materials. Tentative Specifications; B 68-30T; 1930. Seamless Copper Tubing, Bright Annealed. Suitable for use in refrigerators, oil lines, and gasoline lines, requirements on annealing, size of grain, chemical composition, tensile strength and elongation, permissible variations from specified dimensions.

American Society for Testing Matetrials. B 75-30; 1930. Seamless Copper Tubes. Suitable for general engineering purposes, furnished hard drawn unless otherwise specified, purity requirements for copper, sampling, hammering test, opening test, bend, flange, and hydrostatic pressure test requirements, permissible variations from specified dimensions.

Society of Automotive Engineers 1930 Handbook. Copper Tubing; 1922. Chemical composition, expanding test, and bend test requirements for hard-drawn and annealed tubes, dimensional tolerances.

U. S. Gov., Federal Specifications Board WW-P-378; 1930. Seamless Copper Pipe and Tubing. For 4 types dependent on pressure for pressures from 100 to 400 pounds, requirements on physical appearance, purity of copper, dimensions and weights and permissible variations, hydrostatic test, hammering test, flanging test, and tension test.

References.—Copper pipe. *See also* 642.23. Methods of testing, general requirements for metals. *See also* 600.1, 641.0. Automobile fuel and lubrication tube fittings. *See* 722.33.

642.3 GRAVITY BATTERY COPPERS

References.—Gravity battery copper. *See* 712.5.

642.4 COPPER WIRE CLOTH

American Society for Testing Materials. B 50-29; 1929. Nonferrous Insect Screen Cloth. For cloth made of copper wire and cloth of 90 copper-10 zinc alloy wire, for 5 grades of mesh and weight, copper according to A. S. T. M. standard specifications, chemical composition requirements for brass wire, standard sizes, weights, dimensions and tolerances.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R122-31; 1931. Wire Insect Screen Cloth. Simplified practice recommended and accepted by industry establishing a limited number of stock varieties of black painted and electrogalvanized steel wire screen cloth and of copper and commercial bronze wire screen cloth, included standard mesh openings, sizes of wire, widths of roll, length of roll, packing, required percentage of copper for copper and bronze screen wire.

References.—Brass sieves. *See* 645.31. Brass and bronze wire cloth. *See* 645.39, 646.52. Methods of testing, general requirements for metals. *See also* 600.1, 641.0.

642.5 HOLLOW WARE, COPPER

References.—Fuel Tanks for Internal Combustion Engines, of copper. *See* 956.2. Fuel Tanks for Kerosene Stoves, of copper. *See* 956.2. Sterilizers for surgical instruments, dressing containers. *See* 915.32.

642.6 BRUSH COPPER AND MATS

642.61 Brush Copper

642.62 Mats, Copper

642.9 MISCELLANEOUS MANUFACTURES OF COPPER

U. S. Gov., Dept. of Commerce, Bureau of Standards R29; 1924. Eaves Trough, Conductor Pipe, Conductor Elbows, and Fittings. Simplified practice recommended and accepted by industry establishing a limited list of standard types and sizes and minimum thickness of material for iron and for copper pipe, eaves trough, and elbows.

U. S. Gov., Dept. of Commerce, Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Slip Joints. Copper slip joints for steam pipes on steam vessels, mandatory requirements on composition and percentage of copper in composition material, tensile strength and minimum thickness.

U. S. Gov., Federal Specifications Board 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. Copper Plumbers Chain. Metal gage, links per foot, weight, and tensile strength of various sizes.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 641.0. Chemical fire extinguishers of copper. *See* 973.3. Nails, spikes, tacks of copper. *See* 608.1. Terminals and soldering lugs of copper. *See* 715.34, 715.35. Asbestos copper gaskets. *See* 707.11. Electric switches and circuit breakers. *See* 714.52, 714.51. Radio antennas. *See* 718.61. Soldering coppers. *See* 615.71. Lightning rods. *See* 715.50.

643. COPPER ALLOYS

643.1 MANGANESE COPPER

643.2 PHOSPHOR COPPER

American Society for Testing Materials B 52-27; 1927. Phosphor Copper. Chemical composition requirements for two grades, methods of sampling.

U. S. Gov., Federal Specifications Board 118; 1924. Phosphor Copper. Chemical composition requirements for 2 grades furnished as slabs or ingots.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 641.0.

643.3 SILICON COPPER

American Society for Testing Materials B 53-27; 1927. Silicon Copper. Chemical composition requirements, methods of sampling.

U. S., Gov., Federal Specifications Board 119; 1924. Silicon Copper. Chemical composition requirements for one grade furnished as slabs or ingots.

References.—Methods of testing, general requirements for metals. *See also* 600.1. 641.0.

643.4 COPPER-TIN-ZINC ALLOY

American Society for Testing Materials B 10–18; 1918. The Alloy: Copper 88 Per Cent, Tin 10 Per Cent, Zinc 2 Per Cent. Covers the alloy commercially known as government bronze, admiralty gun metal, gun metal, or 88–10–2 mixture, when used in castings, requirements on chemical composition and tension test, methods of sampling and testing.

American Society for Testing Materials B 60–28; 1928. Sand Castings for the Alloy: Copper 88 Per Cent, Tin 8 Per Cent, Zinc 4 Per Cent. For use where strength, resistance to steam or salt water are required, as in pipe fittings and pumps, requirements on chemical composition and tension test.

References.—Other copper-tin-zinc alloys. *See* 646. Methods of testing, general requirements for metals. *See also* 600.1, 641.0.

643.5 COPPER-NICKEL ALLOY

References.—Monel metal and nickel-copper alloys. *See* 654.

643.6 COPPER-NICKEL-ZINC ALLOY

References.—Nickel silver, German silver, nickel-copper-zinc alloys. *See* 655.

643.7 COPPER-BEARING METALS

References.—Bearing metals other than babbitt metal. *See* 692.2.

643.9 MISCELLANEOUS COPPER ALLOYS

References.—Silver Solder. *See* 693.3.

644. BRASS

644.1 BRASS INGOTS AND BARS

644.11 Ingots, Brass

American Society for Testing Materials. Tentative Specifications. B 30–31T; 1931. Copper Base Alloys in Ingot Form for Sand Castings. Chemical composition requirements for 20 brass ingot metal compositions, information on tensile and compressive properties, hardness, shrinkage, and weight, ease of machining and foundry characteristics; includes commercial bronze for general service, brass for high and moderate pressure steam fittings, red brass and yellow brass, brass for air, gas, water, and plumbing fittings, brass for bearings, etc.

American Society for Testing Materials B 45–27; 1927. Methods of Chemical Analysis of Brass Ingots and Sand Castings. Determination of copper, lead, tin, iron, antimony, sulphur, aluminum, solutions required.

References.—Brazing solder ingots. *See* 693.2.

644.12 Bars, Brass

U. S. Gov., Federal Specifications Board 392; 1926. Brass Rods, Bars, Shapes, Plates, Sheets, and Strips, Commercial. Includes in grade A, bars for forging, in grade B, bars, soft and half hard, free cutting in types 1 and 2. General quality requirements, chemical composition and tension test requirements, flattening test requirements for grade A, bend test requirements for grade B, type 1, permissible variations in dimensions.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Brass shapes. *See* 644.22. Brass rods. *See* 645.11. Brass brazing rods. *See* 693.2.

644.2 BRASS PLATES, SHEETS, SHAPES, AND STRIPS

644.21 Plates and Sheets, Brass

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Brass plates and shapes. Requirements on tension test, hot and cold bending test, and hammering test.

American Society for Testing Materials B 19–29; 1929. Cartridge Brass. Sheet brass for making rifle and small arms cartridges, copper according to A. S. T. M. specifications B 4 or B 5, zinc according to A. S. T. M. specifications B 6, chemical composition and hardness test requirements for brass, permissible variations in specified dimensions.

American Society for Testing Materials B 20–29; 1929. Cartridge Brass Disks. Covers brass disks for making artillery cartridge cases, brass according to A. S. T. M. specifications B 19, hardness test requirements, permissible variations from specified dimensions.

American Society for Testing Materials B 36–27; 1927. Sheet High Brass. Covers sheet brass commonly used for drawing, forming, stamping and bending. Material according to A. S. T. M. specifications for lake or electrolytic copper wire bars and for spelter, chemical composition and tests, tempering and annealing grades, hardness and tension test requirements for hard and soft brass, permissible variations in dimensions.

American Society for Testing Materials B 57–27; 1927. Muntz Metal Condenser Tube Plates. For surface condenser tube sheets. Chemical composition requirements, method of sampling, tension and bend test requirements, permissible variation in dimensions.

Society of Automotive Engineers 1931 Handbook. Commercial Brass Sheet; 1929. Chemical composition, tension test, and hardness test requirements for 8 grades of material according to hardness, thickness tolerances.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Brass, sheet. Sample No. 37b prepared and sold by the bureau with a certificate of analysis, for use by industry and by others as a comparison standard for checking the accuracy of analyses of similar materials, etc. Average analysis shown in supplement to C25.

U. S. Gov., Dept. of Commerce, Bureau of Standards C391; 1931. Standard Thicknesses, Weights, and Tolerances of Sheet Metal (Customary Practice). American wire gage for nonferrous alloys. Known also as Brown and Sharpe gage as used for sheets and wire, table of gage numbers, thicknesses, and weights for sheets and plates of commercial brass, naval brass, red brass or gilding metal, cupro-nickel, and nickel silver, permissible variations in thickness.

U. S. Gov., Federal Specifications Board 392; 1926. Brass Rods, Bars, Shapes, Plates, Sheets, and Strips, Commercial. Included in grade C, types 1 and 2, plates, sheets, and strips, of various tempers, type 1 suitable for forming and stamping, type 2 for tags and nameplates. General quality requirements, chemical composition and hardness test requirements, tension test requirements for type 1, permissible variations in dimensions.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Thickness tolerances. *See also* 640.1.

644.22 Shapes, Brass

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Brass plates and shapes. Requirements on tension test, hot and cold bending test, and hammering test.

U. S. Gov., Federal Specifications Board 392; 1926. Brass Rods, Bars, Shapes, Plates, Sheets, and Strips, Commercial. Grade A, rods, bars, and shapes for forging, grade B, types 1 and 2, rods, bars, and shapes, soft and half hard, free cutting, grade C, types 1 and 2, shapes, plates, sheets, and strips, various tempers. General quality and surface appearance requirements, chemical composition and tension test requirements for grade A and type 1 of grades B and C, bend test requirements for type 1 of grade B, flattening test requirements for grade A, hardness test requirements for grade C, permissible variations in dimensions.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Brass bars and rods. *See also* 644.12 645.11.

644.23 Strips, Brass

Society of Automotive Engineers 1931 Handbook. Commercial Brass Sheet; 1929. Includes brass strip, requirements on chemical composition, tension tests, and hardness test for 8 grades of material, graded according to hardness, thickness tolerances.

U. S. Gov., Federal Specifications Board 392; 1926. Brass Rods, Bars, Shapes, Plates, Sheets, and Strips, Commercial. Includes grade C, types 1 and 2, and strips, of various tempers, type 1 suitable for forming and stamping, type 2 for tags and nameplates. General quality requirements, chemical composition and hardness test requirements, tension test requirements for type 1, permissible variations in dimensions.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Thickness tolerances. *See also* 640.1. Standard gage and thicknesses. *See* 644.21.

645. MANUFACTURES OF BRASS

645.1 BRASS RODS AND WIRES

645.11 Rods, Brass

American Railway Assn. Mechanical Division. Recommended Practice; 1924. Welding Wire and Rods. Includes brass rods for gas welding of brass and grey cast iron, two classes of aluminum rods for gas welding of aluminum. Chemical compositions, dimensions and tolerances.

American Society for Testing Materials. B 15–18; 1918. Approved by American Standards Assn. as H 7–1925. Brass Forging Rod. Covers rods that can be forged hot and easily machined. Chemical composition and tests, method of sampling, flattening test requirements, permissible variations in dimensions.

American Society for Testing Materials. B 16–29; 1929. Free Cutting Brass Rod for Use in Screw Machines. For rods finished by cold drawing, chemical composition and bend test requirements, permissible variations from specified dimensions.

American Society for Testing Materials. B 21–29; 1929. Naval Brass Rods for Structural Purposes. For hot-rolled rods with cold draw finish, chemical composition, tension, bend, and internal strain test requirements, permissible variations from specified dimensions.

Society of Automotive Engineers 1931 Handbook. Brass Rod; 1924. Chemical composition and flattening test requirements, dimensions and tolerances, for hot forging and machining.

Society of Automotive Engineers 1931 Handbook. Free-Cutting Brass Rod; 1929. Chemical composition and bend test requirements, dimensions and tolerances.

Society of Automotive Engineers 1931 Handbook. Naval Brass (Tobin Bronze) Rod; 1924. Chemical composition, tensile test, bend test, and strain test requirements, dimensions and tolerances.

U. S. Gov., Federal Specifications Board 269a; 1929. Nonferrous Welding Rods for Gas Welding. Includes type B, naval brass rods, for general welding of brass. general quality and chemical composition requirements, to conform to F. S. B. Spec. 339 for metals.

U. S. Gov., Federal Specifications Board. 392; 1926. Brass Rods, Bars, Shapes, Plates, Sheets, and Strips, Commercial. Includes grade A, rods for forging, grade B, types 1 and 2, rods, soft and half hard, free cutting. General quality requirements, chemical composition requirements, tension test requirements for grade A and type 1 of grade B, bend test requirements for type 1 of grade B, flattening test requirements for grade A, permissible variations in dimensions.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Welding apparatus and practice. *See* 767. Welding wire, brass. *See* 645.12. Brass brazing solder. *See* 693.2.

645.12 Wires, Brass

Society of Automotive Engineers 1931 Handbook. Brass Wire. Intended for springs, chemical composition requirements, tensile strength requirements for two grades. dimensional tolerances.

Society of Automotive Engineers 1931. Handbook. Brass Wire; 1924. Suitable for brazing and torch welding, chemical composition requirements for soft annealed wire.

U. S. Gov.. Federal Specifications Board QQ–W–321; 1930. Brass Wire. Covers 3 grades, soft annealed wire for beading, seizing, etc., wire as drawn for hinge pins, rivets, lamp guards, etc., and spring temper wire for springs, locking rings, etc., requirements on diameter tolerances, chemical composition, tensile strength, ductility test, testing methods to conform to F. S. B. Spec. 339a for metals.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Brass brazing wire. *See* 692.3.

645.2 BRASS CASTINGS, FERRULES, PIPES, AND TUBES

645.21 Castings, Brass

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Brass Castings for machinery and boilers. For 2 grades, one for general purposes and other for propeller blades, etc., requirements on tension test and general quality.

American Marine Standards Committee. H No. 4–1925. Fixed Lights for Ships. Type B, Cast Brass Frame. Dimensions of cast brass frame, size of glass, spacing and sizes of screw holes, for 3 standard sizes of lights.

American Marine Standards Committee. H No. 5–1925. Fixed Lights for Ships, Type C, Cast Brass Finished Frame. Dimensions of cast brass frame, size of glass, spacing and sizes of screw holes, for 3 standard sizes of lights.

American Marine Standards Committee. H No. 38–1928. Deck Drain Strainers, Type A. Dimensions and design of 4 standard sizes of brass strainers.

American Marine Standards Committee. H No. 39–1928. Deck Drain Strainers, Type B. Dimensions of 1 standard type of brass strainer in 4 standard sizes.

American Society for Testing Materials B 45–27; 1927. Methods of Chemical Analysis of Brass Ingots and Sand Castings. Determination of copper, lead, tin, iron, antimony, sulphur, aluminum, solutions required.

American Society for Testing Materials B 62–28; 1928. Composition Brass or Ounce Metal Sand Castings. Commercially known as composition metal, 85–5–5–5, or ounce metal and used for pressures up to 350 pounds. Chemical composition and tension test requirements.

American Society for Testing Materials B 65–28; 1928. Yellow Brass Sand Castings for General Purposes. Chemical composition requirements, optional tension test or fracture test requirements.

Society of Automotive Engineers 1931 Handbook. Cast Brass to be Brazed; 1922. Chemical composition requirements, information on melting point and type of brazing solder to use.

Society of Automotive Engineers 1931 Handbook. Cast Brass Alloys, Red Brass; 1922. Chemical composition requirements, information on strength and casting qualities.

Society of Automotive Engineers 1931 Handbook. Cast Brass Alloys, Yellow Brass; 1922. Chemical composition requirements, information on tensile properties, for use in commercial castings.

U. S. Gov., Federal Specifications Board 272; 1925. Naval and Commercial Brass Castings. General quality requirements, chemical composition requirements for naval brass castings and for commercial brass castings, tensile test requirements for naval brass castings.

U. S. Gov., Federal Specifications Board 286; 1925. Brass Castings To Be Brazed. General requirements on appearance and surface defects, method of sampling, chemical composition requirements and permissible variations for two grades of castings.

References—Methods of testing, general requirements for metals. *See also* 600.1. Brass fittings and plumbing fixtures. *See* 645.4. Brass valves and hydrants. *See* 607.6. Brass builders hardware. *See* 645.6. Bronze castings *See also* 646.41. Brass telephone plugs, jacks. *See* 718.29. Other specifications for brass castings. *See* specifications of individual commodities made of cast brass.

645.22 Ferrules, Brass

American Marine Standards Committee. E No. 1–1926. Condenser Tube Ferrules and Tube Sheets. Dimensioned drawings showing standard ferrules and tube sheets for three sizes of condenser tubes, where tube is packed at both ends and where expanded at one end and packed at other.

Society of Automotive Engineers 1931 Handbook. Flexible Conduit Ferrules; 1928. Dimensions of ferrules or bushings for various sizes of conduit, made of soft sheet brass or soft sheet steel, salt spray test requirements for zinc or cadmium plated steel ferrules.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Ferrule stock. *See* 645.24.

645.23 Pipes, Brass

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Pipes. For seamless copper and brass pipe, requirements on tension, flattening, bending, expanding, and hydrostatic test, formula for thickness as determined by working pressure.

American Society for Testing Materials B 43–24; 1924. Brass Pipe, Standard Sizes. For use in plumbing, boiler feed lines, etc. Annealing, chemical composition, and sampling requirements, hammering, flattening, strain, threading, and hydrostatic test requirements, standard weights and dimensions and permissible variations.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS 10–29; 1929. Brass Pipe Nipples. A commercial standard selected and accepted by industry covering 3 grades of red brass, yellow brass, and Muntz metal, respectively, requirements on general quality of material, chemical composition, standard weights and dimensions of iron pipe sizes of standard and extra strong, internal pressure test, threading, stock, sizes for close, special short, short, and long nipples.

U. S. Gov., Federal Specifications Board. WW–P–351; 1930. Pipe, Brass, Seamless, Iron Pipe Size, Standard and Extra Strong. For 3 grades dependent on copper content, and 2 weights, standard and extra strong. General physical appearance requirements, weights, threads, and dimensions, chemical composition, hydrostatic test, bending test, internal stress test, flattening test, and threading test requirements. Grade A is suitable for salt water, Grade B for corrosive fresh water, and Grade C for fresh water.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Pipe threads and pipe installation. *See* 607.0. Brass tubes. *See also* 645.24. Gas fixture tubing and pipe. *See* 645.9. Brass pipe nipples. *See also* 607.4.

645.24 Tubes, Brass

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Seamless Admiralty condenser tubes and ferrule stock. Requirements on chemical composition and grain size of material, hammering test, expanding test, internal strain test, and hydrostatic pressure test, tolerances on specified dimensions and calculated weights.

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Seamless-drawn brass pipes and tubes. Requirements on tension test, flattening test, bending test, expanding test, and hydrostatic pressure test.

American Institute of Electrical Engineers. Standard No. 45; 1930. Electrical Installations on Shipboard. Conduit Terminal and Bulkhead Stuffing Tubes. Recommended practice on construction and method of assembly of bronze, brass, or galvanized malleable iron stuffing tubes.

American Society for Testing Materials. B 14–18; 1918. Seamless Brass Boiler Tubes. For locomotive boilers. Chemical composition and tests, flange, flattening, and hydrostatic test requirements, standard weights and permissible variations.

American Society for Testing Materials. B 44–29; 1929. Seamless Admiralty Condenser Tubes and Ferrule Stock. For cold-drawn tubes, copper according to A. S. T. M. specifications B 4 or B 5, zinc according to A. S. T. M. specifications B 6, chemical composition, grain size, hammering, expanding, internal strain, and hydrostatic pressure test requirements, permissible variations in specified dimensions.

American Society for Testing Materials. B 55–25; 1925. Seamless 70–30 Brass Condenser Tubes and Ferrule Stock. Material according to A. S. T. M. specifications for electrolytic or lake copper wire bars and for spelter, chemical composition requirements, methods of sampling, microscopic, hammering, expanding, strain, and hydrostatic test requirements, permissible variations in dimensions.

American Society for Testing Materials. B 56–25; 1925. Seamless Muntz Metal Condenser Tubes and Ferrule Stock. Material according to A. S. T. M. specifications for electrolytic or lake copper wire bars and for spelter, chemical composition requirements, methods of sampling, microscopic, hammering, expanding, strain, and hydrostatic test requirements, permissible variations in dimensions of tubes.

Society of Automotive Engineers 1931 Handbook. Annealed Seamless Brass Tubing; 1922. Chemical composition, tensile test, and expanding test requirements, dimensional tolerances.

Society of Automotive Engineers 1931 Handbook. Naval Brass (Tobin Bronze) Tubing; 1922. Chemical composition, tensile test, and expanding test requirements, dimensional tolerances.

U. S. Gov., Federal Specifications Board 374; 1926. Condenser Tubes and Tubes for Ferrule Stock (Admiralty Metal). For condenser tubes suitable for packing or expanding into tube sheets, seamless construction, dimension and weight tolerances, annealing requirements, chemical composition, hydrostatic test, compression test, expanding test, internal strain test, metallographic examination, and flattening test requirements. For ferrule stock tubes, seamless construction, annealing requirements, chemical composition, dimensional and weight tolerances, hydrostatic test, and internal strain test requirements.

U. S. Gov., Federal Specifications Board WW–T–791; 1931. Tubing, Brass, Seamless. For 3 grades dependent on copper content, 4 types dependent on pressure capacity, for pressures of 100 to 450 pounds, standard weights, dimensions, permissible variations, hydrostatic test, internal stress test, flattening test, bend test, flange test, and tension test requirements, chemical composition. Grade 1 is suitable for salt water or salt air, other grades for fresh water.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Bronze tubes. *See also* 646.42. Brass pipe. *See* 645.23. Flexible metallic hose. *See* 607.7. Gas fixture tubing and pipe. *See* 645.0.

645.25 Pipe Fittings, Brass

References.—Brass pipe fittings. *See* 645.4.

645.3 BRASS-WIRE MANUFACTURES

645.31 Sieves, Brass

American Society for Testing Materials E 11–26; 1926. Sieves for Testing Purposes. Construction of woven wire sieves of brass, bronze or other suitable wire, micron designation and corresponding U. S. standard sieve series number, sieve openings, wire diameters, and tolerances for 30 sizes, permissible methods of measurement of openings and wire diameters.

American Society for Testing Materials. Tentative Definition. E 13–28T; 1928. Definition of the Term Screen (Sieve). Covers plate, sheet, or woven cloth types.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Supplement of 1929. Standard Samples. Cement. Sample No. 46o for normal cement and No. 47d for extra fine cement, prepared and sold by the bureau for use in industry and by others as standards for measuring the fineness of testing sieves, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards LC 58; 1929. Three Inch Sieves. For sieves 3 inches in inside diameter, with wire cloth of brass, bronze, or other suitable material conforming to U. S. standard sieve series, requirements on dimensions of sieve, wire diameters, and sieve openings, with tolerances, cloth to be woven for sizes up to No. 230.

U. S. Gov., Dept. of Commerce, Bureau of Standards LC 72; 1922. Sieve Testing Apparatus. Describes apparatus developed at bureau for measuring openings and wire diameters in sieves by projecting an enlarged image of the sieve on a ground glass screen, measuring the image of the wires and measuring the magnification.

U. S. Gov., Dept. of Commerce, Bureau of Standards LC 74; 1926. Standard Specifications for Sieves, "Standard Sieve Series." Standards used by the bureau in testing and certifying sieves, including requirements for the woven sieve cloth, dimensions of sieve, sizes of wire and of sieve openings with tolerances for the standard numbered sieve sizes, wire of brass, bronze or other suitable material. A. S. T. M. specification E 11–26 is in conformity with these standards.

U. S. Gov., Dept. of Commerce, Bureau of Standards T42; 1914. Standardization of No. 200 Cement Sieves. Includes requirements on size of and spacing of wires for standard No. 200 sieve, required sieving value by comparison test with standard sieve at Bureau of Standards. Method of testing and use of standard cement samples for test are described.

References.—Other wire cloth. *See* 645.39, 603.43, 642.4.

645.32 Rings and Hooks, Brass and Bronze

References.—Door hooks and eyes, brass wire. *See* 617.63. Coat hooks, brass. *See* 617.63. Hooks, bronze (builders' hardware). *See* 617.63.

645.39 Miscellaneous Brass-Wire Manufactures

American Society for Testing Materials B 50–29; 1929. Nonferrous Insect Screen Cloth. For cloth made of copper wire and cloth of 90 copper-10 zinc alloy wire, for 5 sizes of mesh and weight, copper according to A. S. T. M. specifications, chemical composition requirements for wire for brass screens, standard sizes, weights, dimensions and tolerances.

Society of Automotive Engineers 1931 Handbook. Wire Cloth; 1924. For mesh sizes 8 to 200, diameter of wire and size of opening, tolerance in spacing and size of wire, materials as specified by purchaser, usually steel or brass up to 80 mesh and phosphor bronze or Monel metal above that size.

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS36–31; 1931. Fourdrinier Wire Cloth. A commercial standard selected and adopted by industry for Fourdrinier wire cloth used in paper-making machines, includes standard meshes and sizes of wire, seam requirements, packing and installation requirements. Usually made of brass, bronze, phosphor bronze, Monel metal, nickel, or stainless steel.

U. S. Gov., Federal Specifications Board 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. Ladder Chain, Register Chain. Wire gage, links per foot, tensile strength, and weight for several sizes of brass chains of each type.

U. S. Gov., Federal Specifications Board 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. Lock Link, Single Jack Chains. Made of brass wire. Dimensions, weight, and tensile strength of one size.

U. S. Gov., Federal Specifications Board. 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. Single Jack Chain, Double Jack Chain. Wire gage, links per foot. tensile strength, and weight requirements for several sizes of brass chains of each type.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Other wire cloth. *See* 603.43, 642.4. Brass sieves. *See* 645.31.

645.4 BRASS FITTINGS AND PLUMBING FIXTURES

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Drain Cocks; 1921. Passage size and pipe thread for sizes up to ½-inch.

Society of Automotive Engineers 1931 Handbook. Fuel and Lubrication Tube Fittings; 1925. Dimensions of soldered type sleeve and nut fittings, of flared type fittings, of compression type sleeve and nut fittings for tubes up to ½-inch.

U. S. Gov., Dept. of Commerce, Bureau of Standards R21; 1925. Brass Lavatory and Sink Traps. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes, styles, and gages for wrought brass traps, cast bend traps, wrought sink traps, wrought and cast antisyphon traps, and New York and Boston regulation traps.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Chain Stay. Dimensions of cast brass stay as illustrated, size of chain and rubber stopper, nickel plating requirements and tests, chemical composition of brass.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Clean-Out Plug. Screw jointed brass plug, illustrated applications with brass cover plate for installations in walls and manhole and cover for installations in floors.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Clean-Sweep Trap. Clean-sweep or centrifugal trap, for floor or wall connection, connection fittings, internal construction of trap not shown but outside view illustrated, chemical composition of brass, nickel plating requirements.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Coat Hook. For cast-brass coat hook, dimensions, chemical composition of brass, nickel plating requirements and tests.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Combined Drain and Trap. Cast-brass type with removable strainer, dimensions and finish, depth of water seal as illustrated.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Down-Spout Nozzles. Dimensions of brass nozzle for outside of building, to be connected to inside down-spout as illustrated.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Drain. Brass shower or urinal drain with removable strainer as illustrated.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Floor, Wall, and Ceiling Plates. Minimum thickness and type of set screw for cast-brass or cast-iron or steel plates for uncovered pipes passing through partitions.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Flushing Tank Mechanism. Construction of high and of low tank flushing mechanisms, dimensions of cast brass gooseneck siphons, dimensions of brass operating chain, rubber ball, and brass overflow pipe.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Glass-Rod Towel Rack. Dimensions, for brass or white metal supporting brackets, chemical composition of metal, nickel plating requirements and tests.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Hinge. Brass spring hinge for water-closet inclosure, main dimension, chemical composition, nickel plating requirements, made of cast or wrought brass.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Lavatory Plug, Sink Plug, Tray Plug. Cast-brass drain outlets and method of fitting as illustrated, provision for strainer and stopper, size and wall thickness of tubular tailpiece, nickel plating requirements, chemical composition of brass.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Nonsiphoning Trap. Brass trap, minimum outside diameter, connection fittings, internal construction not shown, chemical composition of brass, nickel plating requirements, illustrated.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). P Trap. 1½-inch size, construction, nickel plating requirements, illustrated, chemical composition of brass.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). S Trap. 1½ size, construction, chemical composition of brass, nickel plating requirements, illustrated.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Shower Fixtures. Main dimensions and materials of supply pipes, valves, sprinkler head and perforations, curtain frame, and duck curtain, one outfit for use over bath tubs and two outfits for shower bath inclosures, with floor drains. Metal parts of nickel-plated brass.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Soap Cup, Soap Dish with Chain Stay, Soap Dish for Bath Tub. Dimensions, materials, nickel plating requirements and test, for brass soap dishes, dimensions and size of plumbers chain and of stopper for soap dish with chain stay.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Toilet Paper Holder. Dimensions and design of brass holder, chemical composition of brass, nickel plating requirements and tests.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Trimmings for Water-Closet and Bath Inclosures. Cast-brass fittings for slabs and tubing, main dimensions, chemical composition of brass, nickel plating requirements and test thereof.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Tumbler Holder, Tumbler and Toothbrush Holder. For brass or white metal holders, dimensions, chemical composition of material, nickel plating requirements and tests.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Water-Closet Floor Flanges. Dimensions of cast-brass floor flanges for nipple connection, for fitting connection, and for lead pipe connection.

U. S. Gov., Federal Specifications Board. WW-P-448; 1931. Pipe Fittings, Brass or Bronze (Threaded), 125 Pound. Requirements on chemical composition for 2 types of cast bronze fittings and 1 type of wrought fitting, internal pressure test, detail dimensions for elbows, tees, crosses, street tees and elbows, couplings, reducers, return bends, caps, plugs.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Nickel plating. *See also* 600.3. Brass valves. *See also* 607.6. Brass hose couplings and play pipes. *See also* 974.2, 202. Pipe nipples. *See* 607.4, 645.23.

645.5 BRASS OILERS

645.6 BRASS BUILDERS HARDWARE

References.—Builders' hardware of brass. *See* 617.

645.9 MISCELLANEOUS MANUFACTURES OF BRASS

American Gas Assn. Standard Gas Fixture Specifications; 1920. Brass pipe or tubing or iron or steel pipe fixtures. Wall thicknesses, size of threads, for gooseneck, stems and arms, construction and assembly requirements, construction and some dimensional requirements for standard gas fixture cock.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stock; 1930. Report of committee recommending list of standard sizes to be carried in stock of flat, oval, and round head brass wood screws, and of various types of iron screws.

American Society of Mechanical Engineers and Society of Automotive Engineers, sponsors, approved by American Standards Assn. as B 18c–1930. Slotted Head Proportions of Machine Screws, Cap Screws, and Wood Screws. Includes brass wood screws, requirements on standard head and slot proportions for round head, flat head, and oval head brass wood screws.

American Society for Testing Materials B 20–29; 1929. Cartridge Brass Disks. For making artillery cartridge cases. Material to conform to A. S. T. M. specification for cartridge brass, permissible variations in dimensions, hardness requirements.

Society of Automotive Engineers 1931 Handbook. Split and Tubular Rivets; 1929. Dimensions of tubular rivets of flat head, oval head, cupped countersunk head, flat countersunk head types, dimensions of split rivets of flat countersunk and oval head type, dimensions of rivet caps, for brass, wrought iron, or steel rivets.

Underwriters' Laboratories (Inc.) Window Cleaners' Belts and Anchors; 1930. Requirements on chemical composition of brass, monel metal, or copper-nickel forgings for belt hardware and for anchors, tension tests of belt, pull test requirements for anchor, installation of anchor to wooden and metal window frames.

U. S. Gov., Federal Specifications Board FF–S–111; 1931. Screws, Wood. Standard size numbers, diameters, and pitches, dimensions and tolerances for oval head, round head, and flat head screws, standard sizes of brass screws.

U. S. Gov., Federal Specifications Board 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. Brass Chain for Mechanical Communication. Dimensions and tensile strength for one size, 15 links per foot.

U. S. Gov., Federal Specifications Board 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. Brass Safety Chain. Sheet metal gage, links per foot, weight, and tensile strength requirements for various sizes.

U. S. Gov., National Screw Thread Commission. Brass Wood Screws. Standards of N. S. T. C. for wood screws have been adopted by Federal Specifications Board and are incorporated in specification FF–S–111.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Terminals and soldering lugs of brass. *See* 715.34, 715.35. Brass telephone equipment. *See* 718.29. Chemical fire extinguishers, brass. *See* 973.3. Fuel tanks of brass for stoves and gas engines. *See* 956.2. Brazing solder, brass. *See* 693.2. Nails, spikes, tacks, and staples of brass and Muntz metal. *See* 608.1. Brass padlocks. *See* 617.21. Turnbuckles of brass. *See* 608.7. Trolley ears, brass. *See* 719.63. Brass paper fasteners. *See* 932.5.

646. BRONZE

646.0 GENERAL ITEMS

American Society for Testing Materials B 28–19; 1919. Approved by American Standards Assn. as K 4–1921. Methods of Chemical Analysis of Gun Metal. Where phosphorus is present in only very small quantities. Determination of copper, tin corrected for presence of phosphorus, lead, zinc, phosphorus, solutions required.

American Society for Testing Materials B 46–27; 1927. Methods of Chemical Analysis of Bronze Bearing Metal. Procedure for determination of tin given is not always accurate, but errors are usually compensated for where percentage of iron is small. Determination of copper, tin, lead, iron, nickel, zinc, phosphorus, antimony, sulphur, arsenic, aluminum, solutions required.

646.1 BRONZE INGOTS AND BARS

646.11 Ingots, Bronze

American Society for Testing Materials. Tentative Specifications. B 30–31T; 1931. Copper Base Alloys in Ingot Form for Sand Castings. Chemical composition requirements for 20 alloys, including a commercial bronze for general service, information on tensile and compressive properties, hardness, shrinkage, weight, ease of machining and handling in foundry.

U. S. Gov., Federal Specifications Board 290a; 1927. Bronze Ingots (For Remelting). Chemical composition requirements for 10 grades of bronze ingots suitable for stock for castings prescribed in F. S. B. Spec. No. 172a for bronze castings, material to conform to F. S. B. Spec. 339 for metals.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11, 646.0. Aluminum bronze ingots. *See* 647.11. Manganese bronze ingots. *See* 647.21. Phosphor bronze ingots. *See* 647.31.

646.12 Bars, Bronze

References.—Aluminum bronze bars. *See* 647.12. Manganese bronze bars. *See* 647.22. Phosphor bronze bars. *See* 647.32.

646.2 BRONZE PLATES, SHEETS, SHAPES, AND STRIPS

646.21 Plates and Sheets, Bronze

References.—Aluminum bronze plates and sheets. *See* 647.14. Manganese bronze plates and sheets. *See* 647.24. Phosphor bronze plates and sheets. *See* 647.33. Standard gage and thicknesses for plates and sheets. *See* 644.21.

646.22 Shapes, Bronze

References.—Aluminum bronze shapes. *See* 647.16. Manganese bronze shapes. *See* 647.25. Phosphor bronze shapes. *See* 647.35.

646.23 Strips, Bronze

References.—Aluminum bronze strips. *See* 647.17. Manganese bronze strips. *See* 647.24. Phosphor bronze strips. *See* 647.36. Standard gage and thicknesses for nonferrous alloys. *See* 644.21.

646.3 BRONZE RODS AND WIRES

646.31 Rods, Bronze

References.—Tobin bronze (Naval brass) rods. *See* 645.11. Aluminum bronze rods. *See* 647.13. Manganese bronze rods. *See* 647.23. Phosphor bronze rods. *See* 647.38.

646.32 Wires, Bronze

References.—Bronze Trolley Wire. *See* 715.44. Manganese bronze wire. *See* 647.27. Phosphor bronze wire. *See* 647.38.

American Electric Railway Engr. Assn. Recommended Specification D102–29; 1929. Overhead Line Material for Direct and Catenary Suspension. Includes cast bronze trolley wire crossings, frogs, clinch ears, and feed-in yokes. Strength requirements for the bronze, requirements on construction of crossings and frogs, dimensions and permissible variations for clinch ears and feed-in yokes.

American Marine Standards Committee. E No. 23–1928. Built-Up Propellers. For cast-iron or cast-steel hubs and cast-steel or cast-bronze blades, general quality requirements, materials according to American Bureau of Shipping, hammer test for blades, machining requirements for propeller parts, assembly and balance requirements.

American Marine Standards Committee. E No. 25–1928. Propellers Cast in One Piece. For cast bronze propellers, materials according to American Bureau of Shipping specifications, general quality requirements, hammer test and machining requirements, recommendations on degree of balance.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Railway Buildings, Sec. 12–B. Ornamental and Misc. Metal Work. Ornamental castings. For bronze castings, requirements on type of metal pattern used, maximum thickness of metal, permissible stresses.

American Society for Testing Materials. B 10–18; 1918. The Alloy: Copper, 88 Per Cent, Tin, 10 Per Cent, Zinc, 2 Per Cent. Covers the alloy commercially known as Government bronze, admiralty gun-metal, gun metal, or 88–10–2 mixture, when used in castings. Chemical composition and tests, methods of sampling, tension test requirements.

American Society for Testing Materials. B 60–28; 1928. Sand Castings for the Alloy: Copper 88 Per Cent, Tin 8 Per Cent, Zinc 4 Per Cent. For use where strength, resistance to steam or salt water are required, as in pipe fittings and pumps. Chemical composition requirements, tension test requirements.

American Society for Testing Materials. B 61–28; 1928. Steam or Valve Bronze Sand Castings. Chemical composition and tension test requirements.

American Society for Testing Materials. B 66–28; 1928. Bronze Castings in the Rough for Locomotive Wearing Parts. Chemical composition and methods of analysis for hard, medium, soft, and for phosphor bronze, fracture examination.

Society of Automotive Engineers 1931 Handbook. Hard Cast Bronze; 1922. Chemical composition requirements, information on tensile properties, suitable as general utility bronze.

Society of Automotive Engineers 1931 Handbook. Leaded Gun Metal; 1922. Chemical composition requirements, information of tensile properties, suitable for bushings and as general utility bronze.

Society of Automotive Engineers 1931 Handbook. Semiplastic Bronze; 1922. Chemical composition requirements, information on tensile properties, for use as soft bronze with good antifriction qualities.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Cast bronze. Sample No. 52 prepared and sold by the bureau with a certificate of analysis, for use in industry and by others as a comparison standard for checking the accuracy of analysis of similar material, etc. Average analysis shown in supplement to C25.

U. S. Gov., Federal Specifications Board. 172a; 1927. Bronze Castings. Includes 10 grades. Grade 1, a high-grade steam or valve bronze; grade 2, a standard composition for general service, also known as ounce metal, red brass, and hydraulic bronze; grade 3, a medium grade for standard and extra heavy pipe fittings; grade 4, an excellent steam metal and structural bronze; grade 6, a leaded phosphor bronze or leaded gun metal, serves as a steam metal and general structural purposes; grades 7 to 10 are bearing bronzes. Requirements on appearance and surface defects, chemical composition and tensile test requirements, methods of sampling, to conform to F. S. B. Spec. 339 for metals.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11, 646.0. Bronze bearing metals and metal bearings. *See* 692.2, 692.3. Feed-in yokes for trolley wire, bronze. *See* 719.63. Line carrying guns of bronze. *See* 619.1. Water meters of cast bronze. *See* 793.4. Builders' hardware of bronze. *See* 617. Aluminum bronze castings. *See* 647.15. Manganese bronze castings. *See* 647.26. Phosphor bronze castings. *See* 647.34. Other specifications for bronze castings. *See* specifications for individual commodities made of cast bronze.

646.42 Tubes, Bronze

American Institute of Electrical Engineers Standard No. 45; 1930. Electrical Installations on Shipboard. Conduit terminal and Bulkhead Stuffing Tubes. Recommended practice on construction and method of assembly of bronze, brass, or galvanized malleable iron stuffing tubes.

References.—Tobin bronze (Naval brass) tubes. *See* 645.24. Phosphor bronze tubing. *See* 647.37.

646.5 MANUFACTURES OF BRONZE

646.51 Fittings, Bronze

International Assn. of Milk Dealers. Blueprint No. 2; 1923. Standard Sanitary Fitting. Dimensions and thread for standard union type fitting for tubes from 1 inch to 5 inches outside diameter.

International Assn. of Milk Dealers. Drawings No. 1186, 1187, 1188, 1190, 1237, 1238, 1239, 1242, 1243, 1246. Dated 1929. Sanitary Pipe Union with Paper Gasket. Drawings showing dimensions, threading, and assembly of union parts and gasket for 1½, 2, 2½, and 3 inch unions, made of bronze.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11, 646.0. Hose valves, gate valves, check valves for fire protection. *See* 607.6. Other bronze pipe fittings. *See* 645.4.

646.52 Bronze-Wire Manufactures

American Society for Testing Materials E 11–26; 1926. Sieves for Testing Purposes. Construction of woven wire sieves of brass, bronze or other suitable wire, micron designation and corresponding U. S. standard sieve series number, sieve openings, wire diameters, and tolerances for 30 sizes, permissible methods of measurement of openings and wire diameters.

American Society for Testing Materials. Tentative Definition. E 13–28T; 1928. Definition of the Term Screen (Sieve). Covers plate, sheet, or woven cloth types.

Society of Automotive Engineers 1931 Handbook. Wire Cloth; 1924. For mesh sizes 8 to 200, diameter of wire and size of opening, tolerance in spacing and size of wire, materials as specified by purchaser, usually steel or brass up to 80 mesh and phosphor bronze or monel metal above that size.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R122–31; 1931. Wire Insect Screen Cloth. Simplified practice recommended and accepted by industry establishing a limited number of stock varieties of black painted and electrogalvanized steel wire screen cloth and of copper and commercial bronze wire screen cloth, includes standard mesh openings, sizes of wire, widths of roll, length of roll, packing, required percentage of copper for copper and bronze screen wire.

References.—Methods of testing sieves. *See also* 654.31. Copper and brass wire cloth. *See* 642.4, 645.39. Fourdrinier wire cloth of bronze or phosphor bronze. *See* 645.39.

646.59 Miscellaneous Manufactures of Bronze

American Electric Railway Engr. Assn. Recommended Specification E124–29; 1929. Trolley Poles, Wheels, Harps, and Bases. Includes bronze trolley wheels, requirements on chemical composition and hardness, recommended design and dimensions for 3 sizes.

American Electric Railway Engr. Assn. Misc. Methods and Practices; E209–24; 1924. Trolley Wheel Practice. Representative practice on chemical composition of the bronze, diameter, form of groove, balance, bushings of trolley wheels, inspection recommendations.

American Marine Standards Committee E No. 11–1927. Propeller Hub Studs, Nuts, and Lock Screws. For bronze lock screws, dimensions and thread for 3 standard sizes of lock screws for 13 standard nut sizes, material and workmanship in conformity with standards of American Bureau of Shipping.

U. S. Gov., Federal Specifications Board 348; 1925. Standard Miscellaneous Chain and Attachments. Weldless Chain. Bronze Sash Chain. Sheet metal gage, links per foot, weight, tensile strength of various sizes.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11, 646.0. Bronze padlocks. *See* 617.21. Fire hose fittings of bronze. *See* 974.2. Builders hardware of bronze. *See* 617. Aluminum bronze products. *See* 647.1. Manganese bronze products. *See* 647.2. Phosphor bronze products. *See* 647.3.

647. SPECIAL BRONZES (BRONZE ALLOYS)

647.1 ALUMINUM BRONZE

647.11 Ingots, Aluminum Bronze

U. S. Gov., Federal Specifications Board 173a; 1926. Aluminum Bronze Ingots (For Remelting). Chemical composition and tensile test requirements for one grade, to conform to F. S. B. Spec. 339 for metals.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11, 646.0.

647.12 Bars, Aluminum Bronze

Society of Automotive Engineers 1931 Handbook. Wrought Aluminum Bronze; 1929. Chemical composition requirements, thickness tolerances of sheets and strips, information on tensile properties of annealed or hot rolled bars.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11, 646.0.

647.13 Rods, Aluminum Bronze

Society of Automotive Engineers 1931 Handbook. Wrought Aluminum Bronze; 1929. Chemical composition requirements of rods, information on tensile properties of annealed or hot rolled bars.

References.—*See* references under 647.12.

647.14 Plates and Sheets, Aluminum Bronze

Society of Automotive Engineers 1931 Handbook. Wrought Aluminum Bronze; 1929. Chemical composition requirements, thickness tolerances of sheets and strips, information on tensile properties of annealed or hot rolled bars.

References.—*See* references under 647.12. Thickness tolerances. *See* 640.1. Standard gage and thicknesses for nonferrous sheets and plates. *See* 644.21.

647.15 Castings, Aluminum Bronze

American Society for Testing Materials B 59–28; 1928. Aluminum Bronze Castings. Covers two grades of which one responds to heat treatment and the other does not. Copper and aluminum requirements, chemical composition and tension test requirements for each grade.

Society of Automotive Engineers 1931 Handbook. Cast Aluminum Bronze; 1922. Chemical composition requirements, information on tensile properties, for use in worm wheels and gears.

U. S. Gov., Federal Specifications Board 369a; 1926. Aluminum Bronze Castings. For one grade, general quality and appearance requirements, chemical composition and tension test requirements, for use in gun slides, gears, and similar parts.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11, 646.0.

647.16 Shapes, Aluminum Bronze

Society of Automotive Engineers 1931 Handbook. Wrought Aluminum Bronze; 1929. Chemical composition requirements for shapes, information on tensile properties of annealed or hot-rolled bars.

References.—*See* references under 647.15.

647.17 Strips, Aluminum Bronze

Society of Automotive Engineers 1931 Handbook. Wrought Aluminum Bronze; 1929. Chemical composition requirements, thickness tolerances of sheets and strips, information on tensile properties of annealed or hot-rolled bars.

References.—*See* references under 647.15. Thickness tolerances. *See* 640.1. Standard gage and thicknesses for nonferrous strip. *See* 644.21.

647.2 MANGANESE BRONZE

647.20 General Items

American Society for Testing Materials B 27–19; 1919. Approved by American Standards Assn. as K 3–1921. Methods of Chemical Analysis of Manganese Bronze. Determination of lead and copper electrolytically, chemical determination of lead, tin, iron, manganese, solutions required.

U. S. Gov., Dept. of Commerce. Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Manganese Bronze. Sample No. 62 prepared and sold by the bureau with a certificate of analysis, for use in industry and by others as a comparison standard for checking the accuracy of analyses of similar material, etc. Analysis shown in supplement.

647.21 Ingots, Manganese Bronze

American Society for Testing Materials B 7–27; 1927. Manganese Bronze Ingots for Sand Castings. Covers copper-zinc alloy known as manganese bronze. Chemical composition and tension test requirements.

Society of Automotive Engineers 1931 Handbook. Cast Brass Alloys, Manganese Bronze; 1922. Chemical composition and tensile test requirements. Substantially the same as A. S. T. M. Specification No. B7–14.

U. S. Gov., Federal Specifications Board 89; 1923. Manganese Bronze Ingots (For Remelting). Chemical composition and tensile test requirements for one grade.

References.—Methods of chemical analysis, general requirements for metals. *See also* 647.20, 600.1.

647.22 Bars, Manganese Bronze

U. S. Gov., Federal Specifications Board 552; 1928. Bronze, Manganese, Rods, Bars, Shapes, and Plates. Includes bars, soft, half-hard, and hard. Physical appearance, chemical composition, tension test, bend test, hammer test, and internal stress test requirements, permissible variations in dimensions.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 647.20.

647.23 Rods, Manganese Bronze

U. S. Gov., Federal Specifications Board 269a; 1929. Nonferrous Welding Rods for Gas Welding. Includes type A, manganese bronze rods, suitable for welding brass and bronze sheets, plates, shapes and castings, general quality and chemical composition requirements, to conform to F. S. B. Spec. 339 for metals.

U. S. Gov., Federal Specifications Board 552; 1928. Bronze, Manganese, Rods, Bars, Shapes, and Plates. Includes rods, soft, half hard, and hard. Physical appearance, chemical composition, tension test, bend test, hammer test, and internal stress test requirements, permissible variations in dimensions.

References.—*See* references under 647.22. Welding equipment and practice. *See* 767.

647.24 Plates and Sheets, Manganese Bronze

U. S. Gov., Federal Specifications Board 552; 1928. Bronze, Manganese, Rods, Bars, Shapes, and Plates. Includes plates, soft and half hard. Physical appearance, chemical composition, tension test, bend test, internal stress test requirements, permissible variations in dimensions.

References.—*See* references under 647.22. Standard gage and thicknesses for plates and sheets. *See* 644.21.

647.25 Shapes, Manganese Bronze

U. S. Gov., Federal Specifications Board 552; 1928. Bronze, Manganese, Rods, Bars, Shapes, and Plates. Rods, soft, half-hard, and hard; bars, soft, half-hard, and hard; shapes, soft; plates, soft and half-hard. Physical appearance, chemical composition, tension test, bend test, and internal stress test requirements, permissible variations in dimensions.

References.—*See* references under 647.22.

647.26 Castings, Manganese Bronze

American Society for Testing Materials B 54–27; 1927. Manganese Bronze Sand Castings. Chemical composition and tension test requirements.

U. S. Gov., Federal Specifications Board 370; 1926. Manganese Bronze Castings. For one grade, general quality and appearance requirements, chemical composition and tension test requirements. Suitable for propellers, engine frames, gears, worm wheels, torpedo tubes, gun mounts, and where strength, toughness, or resistance to corrosion of sea water is required.

References.— See references under 647.22. Manganese bronze ingots. *See* 647.21.

647.27 Wires, Manganese Bronze

647.3 PHOSPHOR BRONZE

647.31 Ingots and Bearing Metals, Phosphor Bronze

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Bronzes. Includes phosphor bronze castings of 4 grades for various pressure bearings for turntables and movable bridges and for gears and nuts, chemical composition, tension, and compression test requirements.

References.—Bronze bearing metals and metal bearings. *See also* 647.34, 692.2, 692.3. Methods of testing, general requirements for metals. *See also* 600.1.

647.32 Bars, Phosphor Bronze

647.33 Plates and Sheets, Phosphor Bronze

References.—Standard gage and thicknesses for nonferrous sheets and plates. *See* 644.21.

647.34 Castings, Phosphor Bronze

Society of Automotive Engineers 1931 Handbook. Phosphor Bronze; 1922. Chemical composition requirements, information on tensile properties, for use where antifriction qualities are desirable.

Society of Automotive Engineers 1931 Handbook. Phosphor Gear Bronze; 1922. Chemical composition requirements, information on tensile properties, for use in gears and wormwheels.

U. S. Gov., Federal Specifications Board 172a; 1927. Bronze Castings. Includes grade 6, a leaded phosphor bronze serving as steam metal and for general structural purposes, and two grades of phosphor bronze bearing metals. Requirements on appearance, surface defects, chemical composition, tensile tests, and methods of sampling, in conformity with F. S. B. Spec. 339 for metals.

References.—Phosphor bronze bearing metal castings. *See also* 647.31. Methods of testing, general requirements for metals. *See also* 600.1.

647.35 Shapes, Phosphor Bronze

647.36 Strips, Phosphor Bronze

Society of Automotive Engineers 1931 Handbook. Phosphor Bronze Strip; 1922. Chemical composition requirements for two grades, tensile test requirements for three classes of hardness and one spring temper, dimensional tolerances.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Thickness tolerances. *See also* 640.1. Standard gage and thicknesses for strip. *See* 644.21.

647.37 Tubing, Phosphor Bronze

647.38 Wires and Rods, Phosphor Bronze

American Marine Standards Committee. O No. 25–1930. Standard Wire Ropes for Marine Uses. Includes phosphor bronze rope. Requirements on diameter tolerance, lay, strength of wire, strand fabrication, lubrication, dimensions, test requirements for tensile, torsional, and wrapping tests, recommended practice for storage, handling and use, chemical composition requirements of phosphor bronze.

Society of Automotive Engineers 1931 Handbook. Phosphor Bronze Wire; 1922. Intended for springs, chemical composition, bend test, and tensile test requirements, dimensional tolerances.

U. S. Gov., Federal Specifications Board 297; 1925. Wire Rope. Includes phosphor bronze wire rope. Strength and torsional test requirements of wire, construction, dimensions, weight, breaking strength, safe load for cable, sizes of sheaves or drums, information on handling, application of seizing, sockets, and clips, care and usual application.

U. S. Govt., Federal Specification Board 532; 1927. Wire, Spring, Phosphor Bronze. For one grade, permissible variations from nominal diameter, chemical composition, tension test, bend test, and fracture test requirements. For use in manufacture of helical springs.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Iron and steel wire and wire rope. *See* 603.41, 603.42. Wire gages. *See* 603.40. Wire cloth of phosphor bronze. *See* 646.52.

650–659 LEAD, MERCURY, AND NICKEL

651. LEAD

651.0 GENERAL ITEMS

American Society for Testing Materials B 35–24; 1924. Methods of Chemical Analysis of Pig Lead. Methods and solutions required for determination of silver, bismuth, arsenic, antimony, tin, copper, cadmium, iron, zinc, nickel and cobalt.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples.

Lead. Sample No. 49, prepared and sold by the bureau with a certificate giving the melting point, for use in industry and by others as standards for calibrating pyrometers, etc.

651.1 LEAD INGOTS

American Society for Testing Materials B 29–23; 1923. Pig Lead. Chemical composition limitations for corroding lead, chemical lead, and common lead, methods of sampling.

U. S. Gov., Federal Specifications Board QQ–L–171; 1931. Pig Lead. Grade A for foundry use, grade B for weights, ballast, etc., chemical composition requirements.

References.—Methods of chemical analysis, general requirements for metals. *See* 651.0, 600.1.

651.2 BAR LEAD

651.3 CASTINGS, LEAD

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders Hardware. Sash Weights. General quality requirements for round and square sash weights of cast lead.

651.4 STRIPS AND SLEEVES, LEAD

651.5 SHEET LEAD

U. S. Gov., Dept. of Commerce, Bureau of Standards C391; 1931. Standard Thicknesses, Weights, and Tolerances of Sheet Metal (Customary Practice). Sheet Lead. Commonly ordered on basis of weight per square foot, table of usual thicknesses and weights, permissible variations in weight.

U. S. Gov., Federal Specifications Board 308; 1925. Sheet Lead. General appearance, thickness tolerance, and chemical composition requirements for two grades of sheet lead.

References.—Methods of test, general requirements for metals. *See also* 600.1. 651.0.

651.6 LEAD ALLOYS

International Assn. of Electrotypers of America. Standards for Electrotypes; 1930. For electrotype backing metal, requirements on percentages of tin, antimony, and lead.

References.—Babbitt metal. *See* 692.1. Solder. *See* 693.1. Methods of analysis. *See* 692.0.

651.7 LEAD COMPOUNDS AND SALTS

References.—Chemical compounds of lead. *See* 839.35.

651.9 MISCELLANEOUS MANUFACTURES OF LEAD

International Assn. of Electrotypers of America. Standards for Electrotypes; 1930. Standard thicknesses for unmounted electrotypes (ad plates and patent bases), thickness of curved plates, angle of bevel of patent base plates, and standard formula for electrotype backing metal.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 651.0, 692.0. Lead carboys. *See* 955.2. Chemical hand fire extinguishers of lead. *See* 973.3. Storage batteries. *See* 712.2. Lead pigments and paints. *See* 840–849.

652. MERCURY

652.1 MERCURY COMPOUNDS AND SALTS

References.—Chemical compounds of mercury. *See* 839.36.

653. NICKEL

653.0 GENERAL ITEMS

American Society for Testing Materials B 41–23; 1923. Methods of Chemical Analysis of Nickel. Determination of iron, carbon, sulphur, cobalt and nickel, reagents and solutions required.

653.1 NICKEL METAL, INGOTS, AND SHOT

American Society for Testing Materials. B39–22; 1922. Nickel. Covers four grades, electrolytic, suitable for high grades of malleable alloys, " X " shot, suitable for nonferrous alloys and nickel steel, "A" shot, suitable for anodes, and ingot, suitable for open-hearth and electric-furnace nickel steel, chemical composition and methods of sampling for each grade.

U. S. Gov., Federal Specifications Board 371; 1926. Nickel, for Remelting. For 3 grades furnished in cathodes, plates, pigs, ingots, cubes, or shot form, chemical composition requirements and methods of sampling.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 653.0. Nickel plating. *See also* 600.3. Chemical compounds of nickel. *See* 839.39.

653.2 NICKEL BARS

653.3 NICKEL MANUFACTURES

653.31 Nickel Sheets

653.32 Nickel Wire

References.—Nickel-chromium wire. *See* 715.43. Fourdrinier wire cloth of nickel wire. *See* 645.39.

654. NICKEL-COPPER ALLOYS (MONEL METAL)

654.1 NICKEL-COPPER METAL, INGOTS, AND SHOT

654.2 NICKEL-COPPER BARS

U. S. Gov., Federal Specifications Board 585; 1928. Copper-Nickel Alloy Rods, Bars, Shapes, Plates, Sheets, and Strips. Requirements on chemical composition of alloy, tensile strength, elongation, bend test, permissible variations in dimensions from specified quantities, hammer test for rods and bars, F. S. B. Spec. 339 for metals applies.

References.—Methods of testing, general requirements for metals. *See also* 600.1.

654.3 STRIPS, NICKEL-COPPER

U. S. Gov., Federal Specifications Board 585; 1928. Copper-Nickel Alloy Rods, Bars, Shapes, Plates, Sheets, and Strips. Requirements on chemical composition of alloy, tensile strength, elongation, bend test, permissible variations in dimensions from specified quantities, hammer test for rods and bars, F. S. B. Spec. 339 for metals applies.

References.—*See* references under 654.2. Standard gage and thicknesses. *See also* 644.21, 654.52.

654.4 SHAPES, NICKEL-COPPER

U. S. Gov., Federal Specifications Board 585; 1928. Copper-Nickel Alloy Rods, Bars, Shapes, Plates, Sheets, and Strips. Requirements on chemical composition of alloy, tensile strength, elongation, bend test, permissible variations in dimensions from specified quantities, hammer test for bars and rods, F. S. B. Spec. 339 for metals applies.

References.—*See* references under 654.2.

654.5 NICKEL-COPPER MANUFACTURES

654.51 Castings and Forgings, Nickel-Copper

Society of Automotive Engineers 1931 Handbook. Cast Brass Alloys, White Nickel Brass; 1922. Chemical composition requirements, information on tensile properties and use as trimming.

U. S. Gov., Federal Specifications Board 578; 1928. Copper-Nickel Alloy Castings. For one grade, physical appearance, chemical composition, and tension test requirements.

References.—Methods of testing, general requirements for metals. *See also* 600.1.

654.52 Sheets and Plates, Nickel-Copper

U. S. Gov., Dept. of Commerce, Bureau of Standards C391; 1931. Standard Thicknesses, Weights, and Tolerances of Sheet Metal (Customary Practice). Monel Metal Gage. Thicknesses correspond to wrought iron thicknesses of U. S. standard gage for sheet and plate iron and steel, table of gage numbers, thicknesses, and weights, permissible variations in thickness.

U. S. Gov., Federal Specifications Board 585; 1928. Copper-Nickel Alloy Rods, Bars, Shapes, Plates, Sheets, and Strips. Requirements on chemical composition of alloy, tensile strength, elongation, bend test, permissible variations in dimensions from specified quantities, hammer test for bars and rods, F. S. B. Spec. 339 for metals applies.

References.—See references under 654.51. Standard gage and thicknesses for nonferrous alloy plates and sheets. *See also* 644.21.

654.53 Rods, Nickel-Copper

U. S. Gov., Federal Specifications Board 269a; 1929. Nonferrous Welding Rods for Gas Welding. Includes type F, Monel rods, for welding of Monel metal castings and gray iron castings, general quality and chemical composition requirements, to conform to F. S. B. Spec. 339 for metals.

U. S. Gov., Federal Specifications Board 585; 1928. Copper-Nickel Alloy Rods, Bars, Shapes, Plates, Sheets, and Strips. Requirements on chemical composition of alloy, tensile strength, elongation, bend test, permissible variations in dimensions from specified quantities, hammer test for bars and rods, F. S. B. Spec. 339 for metals applies.

References.—See references under 654.51.

654.54 Wires and Cables, Nickel-Copper

654.59 Miscellaneous Manufactures of Nickel-Copper

Underwriters' Laboratories, (Inc.). Window Cleaners' Belts and Anchors; 1930. Requirements on chemical composition of brass, monel metal, or copper-nickel forgings for belt hardware and for anchors, tension tests of belt, pull test requirements for anchor, installation of anchor to wooden and metal window frames.

References.—Fourdrinier wire cloth of monel metal. *See* 645.39.

655. NICKEL-COPPER-ZINC ALLOYS (NICKEL SILVER AND GERMAN SILVER)

655.1 BARS, NICKEL-COPPER-ZINC ALLOY

U. S. Gov., Federal Specifications Board. 468; 1927. Silver, Nickel, Rods, Bars, Shapes, Plates, Sheets, and Strips (German Silver). Grade A, readily machinable and with fine finish, grade B suitable for screw machine work. Physical appearance requirements, chemical composition requirements, permissible variations in dimensions.

References.—Methods of testing, general requirements for metals. *See also* 600.1.

655.2 SHEETS AND PLATES, NICKEL-COPPER-ZINC ALLOY

U. S. Gov., Federal Specifications Board. 468; 1927. Silver, Nickel, Rods, Bars, Shapes, Plates, Sheets, and Strips (German Silver). Grade A, readily machinable and with fine finish, grade B suitable for screw machine work. Physical appearance requirements, chemical composition requirements, permissible variations in dimensions, for nickel silver sheets and plates.

References.—See references under 655.1. Standard gage and thicknesses of nonferrous alloy sheets and plates. *See* 644.21.

655.3 SHAPES AND CASTINGS, NICKEL-COPPER-ZINC ALLOY

U. S. Gov., Federal Specifications Board. 468; 1927. Silver, Nickel, Rods, Bars, Shapes, Plates, Sheets, and Strips (German Silver). Grade A, readily machinable and with fine finish, grade B suitable for screw machine work. Physical appearance requirements, chemical composition requirements, permissible variations in dimensions, for nickel silver shapes.

U. S. Gov., Federal Specifications Board FF–H–101; 1930. Builders' Hardware, Nontemplate. Nickel bronze. Requirements on chemical composition of cast nickel bronze, nickel silver, or white metal and of wrought nickel bronze, nickel silver, or white metal, when these materials are used in builders' hardware.

References.—See references under 655.1.

655.4 STRIPS, NICKEL-COPPER-ZINC ALLOY

U. S. Gov., Federal Specifications Board. 468; 1927 Silver, Nickel, Rods, Bars, Shapes, Plates, Sheets, and Strips (German Silver). Grade A, readily machinable and with fine finish, grade B suitable for screw machine work. Physical appearance requirements, chemical composition requirements, permissible variations in dimensions, for nickel-silver strips.

References.—See references under 655.1.

655.5 WIRES AND RODS, NICKEL-COPPER-ZINC ALLOY

U. S. Gov., Federal Specifications Board. 468; 1927. Silver, Nickel, Rods, Bars, Shapes, Plates, Sheets, and Strips (German Silver). Grade A, readily machinable and with fine finish, grade B suitable for screw machine work. Physical appearance requirements, chemical composition requirements, permissible variations in dimensions from the specified, for nickel silver rods.

References.—See references under 655.1. Methods of analysis and testing of high resistance electrical wire. *See* 715.43.

655.6 HOLLOW AND STAMPED WARE, NICKEL-COPPER-ZINC ALLOY

American Railway Assn., Telegraph and Telephone Section 2–G–5 and 2–G–6; 1924. Fuse Block ARA–1–A and ARA–2–A. Includes fuse clips of German silver, requirements on thickness, hardness, and chemical composition.

References.—See references under 655.1.

655.9 MISCELLANEOUS SPECIFICATIONS FOR NICKEL-COPPER-ZINC ALLOY

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (for Land Use). Trimmings and Fittings. Where white metal is preferred for trimmings and fittings, requirements on percentages of copper, nickel, lead, tin, and zinc, permissible impurities.

References.—German silver contacts for telephone jacks. *See* 718.29. Drawing instruments of nickel silver. *See* 935. Methods of testing, general requirements for metals. *See also* 600.1.

656. NICKEL-CHROME ALLOY

656.0 GENERAL ITEMS

American Society for Testing Materials Tentative Methods B 71–29T; 1929. Methods of Chemical Analysis of Metallic Materials for Electrical Heating. Reagents required and method of determination of nickle, chromium, iron, manganese, carbon, insoluble residue, silicon, sulphur, copper, desciiptions and illustrations of test apparatus.

References.—Electrical testing of materials for electrical heating. *See* 715.43. Nickel chromium alloys for electrical heating elements. *See* 715.43.

660–669 PRECIOUS METALS, METAL JEWELRY, AND PLATED WARE

661. PLATINUM AND PLATINUM JEWELRY

662. GOLD AND DENTAL GOLD ALLOYS

U. S. Gov., Dept. of Commerce, Bureau of Standards C43; 1921. Jewelers and Silversmiths Weights and Measures. Includes gold karats, a table showing decimal equivalents of gold karats or fineness, the number of karats indicating the number of 24ths of pure gold in an alloy.

U. S. Gov., Dept. of Commerce, Bureau of Standards S532; 1926. Analysis of Dental Gold Alloys. Describes methods developed at bureau for sampling the alloys and for detection and determination of silver, iridium, tin, gold, palladium, copper, rhodium, zinc, nickel, manganese, iron, magnesium, with typical analyses of several alloys.

663. SILVER

References.—Silver and silverware. *See* 691.

670–679 CLOCKS, WATCHES, AND DIALS

671. CLOCKS

References.—Electric time clock systems. *See* 718.35. Testing of timepieces. *See* 672.

672. WATCHES

National Watch Case Mfrs, Assn. Ruling of the Federal Trade Commission indorsed by N. W. C. M. A. and by manufacturers of gold filled and gold plated watch cases; 1930. Requirements on minimum thicknesses of gold layers on various parts of watch cases for each of the 3 standard time guarantees of 25 year, 20 year, and 10 year; required thickness of gold with which use of the word "gold" on watch case is permitted.

U. S. Gov., Dept. of Commerce, Bureau of Standards C43; 1921. Jewelers and Silversmiths Weights and Measures. Includes a table of standard watch sizes as used in U. S. with diameters for various watch size numbers and with comparison with European standard sizes.

U. S. Gov., Dept. of Commerce, Bureau of Standards C51; 1914. Measurement of Time and Test of Timepieces. Describes test procedure at Bureau of Standards and tolerances allowed in performance of a watch for which a certificate is issued by bureau. Tests cover position test, isochronism test, and temperature test.

673. DIALS

680–689 TIN AND ZINC

681. TIN

681.0 GENERAL ITEMS

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Tin. Sample No. 42b prepared and sold by the bureau with a certificate giving the melting point, for use in industry and by others as standards for calibrating pyrometers, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards C66; 1917. Standard Samples for Thermometric Fixed Points. Description of preparation of pure samples of tin, their chemical analyses, freezing points, and degree of purity, used for the standardization of thermocouples, pyrometers, etc.

681.1 TIN INGOTS AND PIG METAL

National Metal Exchange, (Inc.). By-laws and Rules; 1931. Tenderable Grades of Tin. A list of the standard brands of tin which may be delivered against the standard tin contract of the Nat. Metal Exchange, such as Straits, Banka, Australian, etc., minimum tin content of above brands.

U. S. Gov., Federal Specifications Board 90; 1923. Pig Tin. Grade A of new metal, grade B may be Chinese tin or contain remelted metal, chemical composition requirements for the 2 grades.

References.—General requirements for metals. *See also* 600.1.

681.2 TIN SHEETS

References.—Roofing tin, terneplate. *See* 604.31.

681.3 TIN CASTINGS

681.4 TIN MANUFACTURES

681.41 Tin Hollow Ware

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Dust Pan. Dimensions, metal gage, and design of pan with long bail type handle, of tin or cold rolled steel.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Marking Pot. Dimensions, metal gage, and design of marking pot with tubular handle, of tin or cold-rolled steel.

American Railway Assn. Mechanical Div. Recommmended Practice. Tinware, Standardization of; 1915. One Pint, One Quart, and One Gallon Funnels. Dimensions, metal gage, and design of conical shape funnels of tin or cold-rolled steel.

References.—Standard sizes of tin ware. *See also* 612.20. Liquid and dry measures of tin. *See* 919.1. Metal kits and pails. *See* 951.61, 951.64. Tin coatings, test of. *See* 600.3. Illuminating torch for railways, tin. *See* 997.1. Tin cans. *See* 959.1.

681.42 Tin Coatings

References.—Test of tin coatings. *See* 600.3. Roofing tin, terneplate. *See* 604.31.

681.43 Tin Alloys

References.—Bronzes. *See* 643., 646., 647., 692.3. Phosphor tin. *See* 682. Babbitt metal. *See* 692.1. Solder. *See* 693.2.

681.49 Miscellaneous Tin Manufactures

American Bottlers of Carbonated Beverages. Educ. Bull. No. 4; 1930. Rubber Hose and Block Tin Tubing. Recommended practice on standard diameters to be used for inside diameters of rubber hose and block tin tubing and for outside diameter of light gage metal syrup line tubing.

American Bottlers of Carbonated Beverages. Educ. Bull. No. 4; 1930. Tubing Connections or Couplings. For sirup line connections, standard dimensions of union type coupling with ferrule and swivel for pipe sizes up to 2 inch. Recommended practice on compression coupling for light gage metal tubing up to 2-inch size, with dimensions of union nut, follower, and coupling body, for carbonated water and sirup line connections.

References.—Cans made from tin plate. *See* 959.1.

682. PHOSPHOR TIN

American Society for Testing Materials. B 51–27; 1927. Phosphor Tin. Chemical composition and sampling requirements.

U. S. Gov., Federal Specifications Board 116; 1924. Phosphor Tin. Chemical composition requirements for one grade made of new material, furnished as slabs or ingots.

References.—General requirements for metals. *See also* 600.1.

683. ZINC

683.0 GENERAL ITEMS

American Society for Testing Materials. B 38–21; 1921. Methods of Chemical Analysis of Spelter. Based on the standard methods of analysis for spelter of the American Chemical Society, see p. 547, J. of Industrial and Engineering Chemistry, vol. 7; 1915. Determination of lead and cadmium by electrolytic and other methods, determination of iron, solutions required.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Zinc Ore D. Sample No. 2 prepared and sold by the bureau with a certificate giving percentage of zinc, for use by industrial organizations and others as a comparison standard in checking the accuracy of analysis of zinc ores, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Zinc. Sample No. 43b, prepared and sold by the bureau with a certificate giving the melting point, for use in industry and by others as standards for calibrating pyrometers, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards C66; 1917. Standard Samples for Thermometric Fixed Points. Description of preparation of pure samples of zinc, their chemical analyses, freezing point, and degree of purity, their use for the standardization of thermocouples, pyrometers, etc.

683.1 ZINC OR SPELTER INGOT METALS

American Society for Testing Materials. B 6–18; 1918. Spelter. Chemical composition requirements for five grades of virgin spelter, methods for sampling. Available in Spanish and French from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

U. S. Gov., Federal Specifications Board. 91a; 1927. Zinc, Slab (Spelter). Chemical composition and method of sampling requirements for 5 grades.

References.—Methods of test, general requirements for metals. *See also* 600.1, 683.0.

683.2 ZINC SHEETS AND PLATES

American Society for Testing Materials. B 69–29; 1929. Rolled Zinc. Covers 3 types ribbon, sheet, and boiler or name plate zinc. Rolling requirements, classification according to temper; temper, dynamic ductility, and bend test requirements for various grades and thicknesses, permissible variations in dimensions.

U. S. Gov., Dept. of Commerce, Bureau of Standards C391; 1931. Standard Thicknesses, Weights, and Tolerances of Sheet Metal (Customary Practice). American zinc gage. Table of gage numbers, thicknesses, and weights of zinc sheets, strips, and plates, permissible variations in thickness.

U. S. Gov., Federal Specifications Board. 531; 1927. Zinc Plates, Sheets, and Strips. For one grade of zinc in 3 types; type A, ribbon zinc and sheets or strips cut from ribbon zinc; type B, sheet zinc or strips cut from sheet zinc; type C, boiler plate, name plates, tags, etc. Physical appearance, chemical composition, and bend test requirements, permissible variations from specified dimensions.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 683.0. Zinc coated iron and steel sheets. *See* 604.32.

683.3 ZINC STRIPS

American Society for Testing Materials. B 69–29; 1929. Rolled Zinc. Covers 3 types, ribbon, sheet, and boiler or name plate zinc. Rolling requirements, classification according to temper; temper, dynamic ductility, and bend test requirements for various grades and thicknesses, permissible variations in dimensions.

U. S. Gov., Federal Specifications Board. 531; 1927. Zinc Plates, Sheets, and Strips. For one grade of zinc in 3 types; type A, ribbon zinc and sheets or strips cut from ribbon zinc; type B, sheet zinc or strips cut from sheet zinc; type C, boiler plate, name plates, tags, etc. Physical appearance, chemical composition, and bend test requirements, permissible variations from specified dimensions.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 683.0. Standard thicknesses, weights, and tolerances. *See* 683.2.

683.4 ZINC MANUFACTURES

683.41 Zinc-Base Die Castings

American Society for Testing Materials. Tentative Specifications. B 86–31T; 1931. Zinc Base Alloy Die Castings. Requirements on chemical composition of alloy, permissible impurities in slab zinc used as base, requirements on expansion, tensile test, impact test, aging.

U. S. Gov., Dept. of Commerce, Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Zinc-base die casting alloys. Samples No. 94, No. 95, and No. 96, prepared and sold by the bureau with a certificate giving the analysis of each, for use in industry and by others as comparison standards for checking the accuracy of analyses of similar materials, etc. Analysis of each shown in supplement.

References.—Methods of test, general requirements for metals. *See also* 600.1, 683.0.

683.42 Gravity Battery Zincs

References.—Gravity battery zincs. *See* 712.5.

683.49 Miscellaneous Zinc Manufactures

References.—Nails, spikes, tacks, and staples of zinc. *See* 608.1.

683.5 ZINC ALLOYS

References.—Zinc base die casting alloys. *See* 683.41. Copper-tin-zinc alloys. *See* 643., 646., 647. Brass. *See* 644., 645. Nickel-copper-zinc alloys. *See* 655. Brazing solder, brass. *See* 693.2.

683.6 ZINC COMPOUNDS AND SALTS

References.—Chemical compounds of zinc. *See* 839.38.

684. ZINC COATINGS (GALVANIZING)

References.—Zinc coated sheets. *See* 604.32. Zinc coatings and tests. *See also* 600.3.

690–699 MISCELLANEOUS ORES, METALS, ALLOYS, AND METAL MANUFACTURES

691. SILVER

691.0 GENERAL ITEMS

U. S. Gov., Congress. 34 Stat. at Large, 260; June 13, 1906. National Stamping Act. Forbidding the importation, exportation, or carriage in interstate commerce of falsely or spuriously stamped articles of merchandise made of gold or silver or their alloys. Includes a definition of the word "sterling" when used to mark silver, requirements on percentage of pure silver.

691.1 SILVER METAL AND ALLOYS

American Society for Testing Materials. Tentative. Specifications. B 86–31T; 1931. Zinc Base Alloy Vol. XVII of Journal of Am. Dental Assn. for Jan. 1930. The requirements are the same as those given in U–A–451 of the Federal Specifications Board with the exception of some differences in method of determination of compressive strength and package sizes and labeling.

National Metal Exchange (Inc.). By Laws and Rules; 1931. Silver Brands or Markings. Requirements on the silver content of bars offered under brands or markings kept on the official list of brands tenderable on Exchange contracts.

U. S. Gov., Federal Specifications Board U–A–451; 1931. Amalgam Dental Alloy. For shavings and for filings, requirements on time of amalgamation, absence of granular or sandy consistency when amalgamated, length of time in which susceptible to carving and polishing, chemical composition, compressive strength, flow, length changes on setting, methods of test.

References.—Silver solder. *See* 693.3. Definition of sterling. *See* 691.0.

691.2 SILVERWARE

American Marine Standards Committee. O No. 9–1926. Kinds and Sizes of Silverware for Ship Equipment. List of kinds and sizes of hollow ware and list of flat ware including 18 per cent alloy metal unplated.

U. S. Gov., Dept. of Commerce, Bureau of Standards R54; 1926. Sterling Silver Flatware. Simplified practice recommended and accepted by industry establishing a limited list of standard stock items in sterling silver flatware patterns, covers 3 weights of tea spoons, other items listed by name without further qualification, divided into staples, fancy dozens, carving sets, etc.

U. S. Gov., Federal Specifications Board. RR–T–51; 1931. Silver Plated Tableware. For flatware and hollow ware for frequent use and for flatware and hollow ware for occasional use, requirements on composition of base metal, soldering of hollow ware, weight of flatware blanks, thickness and weight of silver, methods of measurement; chemical composition and corrosion test for corrosion resisting steel knife blades.

References.—Definition of sterling. *See* 691.0.

691.3 SILVER COMPOUNDS AND SALTS

References.—Chemical compounds of silver. *See* 839.37.

692. BABBITT AND OTHER BEARING METALS

692.0 GENERAL ITEMS

American Electric Railway Engr. Assn. Recommended practice E120–27; 1927. Limits of wear for parts affecting gear centers.

American Society for Testing Materials. B 18–21; 1921. Approved by American Standards Assn. as K 5–1922. Methods of Chemical Analysis of Alloys of Lead, Tin, Antimony and Copper. Methods apply particularly to babbitt metal and similar lead and tin base alloys. Two methods given of which one is slow but more accurate. Determination of lead, copper, antimony, tin, and arsenic.

692.1 BABBITT METALS

American Electric Railway Engr. Assn. Misc. Methods and Practices. E212–25; 1925. Armature and Axle Liners. Chemical composition of representative bronze shells and babbitt metal for armature bearings, recommended clearances for armature and axle bearings, detailed approved method for making babbitted bearings.

American Railway Assn. Mechanical Div. Recommended Practice; 1926. Bearings, Journal, Lined. Construction, chemical analysis of brass back and of bearing metal lining, appearance of fracture.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Includes babbitt metal, chemical composition requirements.

American Society for Testing Materials B 23–26; 1926. White Metal Bearing Alloys. Covers 12 typical babbitt metals. Dimensions of standard bar, chemical composition requirements and permissible variations, methods of sampling.

American Society for Testing Materials B 67–28; 1928. Car and Tender Journal Bearings, Lined. Chemical composition of and test requirements for babbitt metal lining and bronze backing, fracture and chipping tests.

Society of Automotive Engineers 1931 Handbook. White Bearing Metals; 1922. Chemical composition requirements for five grades of babbitt metal, and general applications in bearings. Suitable for die castings.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Lead-base bearing metal. Sample No. 53 prepared and sold by the bureau with a certificate of analysis, for use in industry and by others as a comparison standard for checking the accuracy of analysis of similar materials, etc. Supplement shows average analysis.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Tin-base bearing metal. Sample No. 54a prepared and sold by the bureau for use in industry and by others as a comparison standard for checking the accuracy of analyses of similar materials, etc. Supplement shows average analysis.

U. S. Gov., Federal Specifications Board 536; 1927. Metal, Antifriction, Ingots and Castings. Covers 7 grades of babbitt metal, chemical composition and sampling requirements. Grade 1 medium hard suitable for aircraft engine bearings; grade 2, hard, suitable for automotive engine bearings; grade 3 for moderately heavy pressures; grade 4, hard, for very heavy pressures and high speeds; grade 5 for low pressure and high speed as for electric motors; grade 6 for large bearings and light service; grade 7 for slightly more severe service than 6.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 692.0. Bronze backings of lined bearings. *See also* 692.2.

692.2 BEARING METALS, OTHER THAN BABBITT

American Electric Railway Engr. Assn. Misc. Methods and Practices E212–25. 1925. Armature and Axle Liners. Chemical composition of representative bronze shells and babbitt metal for armature bearings, recommended clearances for armature and axle bearings, detailed approved method of making babbitted bearings.

American Railway Assn. Mechanical Div. Recommended Practice; 1926. Bearings, Bronze, for Locomotives. Rough bronze castings, chemical composition, appearance of fracture test.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Bronzes. Includes phosphor bronze castings of 4 grades for various pressure bearings for turntables and movable bridges and for gears and nuts, chemical composition, tension, and compression test requirements.

American Society for Testing Materials B 22–21; 1921. Bronze Bearing Metals for Turntables and Movable Railroad Bridges. Covers class A for contact with hardened steel disks under pressures over 1,500 pounds, such as turntables; class B for contact with soft steel at low speeds under pressures less than 1,500 pounds, such as trunnions of bascule bridges; class C for ordinary machinery bearings; class D for gears, worm wheels, nuts where stresses are other than compressive. Copper of the copper tin alloy to be according to A. S. T. M. specifications for electrolytic copper wire bars or lake copper wire bars (serial B 5 and B 4), chemical composition, compression and tension test requirements.

American Society for Testing Materials B 31–21; 1921. Bronze Bearing Metal in Ingot Form. Covers 6 copper-tin-lead alloys made wholly or partly from scrap materials. Chemical composition requirements and permissible variations, methods of sampling.

American Society for Testing Materials B 66–28; 1928. Bronze Castings in the Rough for Locomotive Wearing Parts. Chemical composition and tests for hard, medium, soft, and phosphor bronze, fracture examination.

American Society for Testing Materials Tentative Specifications B 74–28T; 1928. Sand Castings of the Alloy; Copper 80 Per Cent, Tin 10 Per Cent, Lead 10 Per Cent. Intended for use for bearings and bushings and to resist mild acids as in mine waters, general quality, chemical composition, and tension test requirements.

Society of Automotive Engineers 1931 Handbook. Bronze Backing for Lined Bearings; 1922. Chemical composition requirements, information on tensile properties.

Society of Automotive Engineers 1931 Handbook. Phosphor Bronze; 1922. Chemical composition requirements, information on tensile properties, for use where antifriction qualities are desirable.

Society of Automotive Engineers 1931 Handbook. Semiplastic Bronze; 1922. Chemical composition requirements, information on tensile properties, for use as soft bronze with good antifriction qualities.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Phosphor bronze bearing metal. Sample No. 63 prepared and sold by the bureau with a certificate of analysis, for use in industry and by others as a comparison standard for checking the accuracy of analyses of similar material, etc. Analysis shown in supplement.

U. S. Gov., Federal Specifications Board. 172a; 1927. Bronze Castings. Includes 4 grades of bronze bearing metals. Requirements on appearance, surface defects, chemical composition, tensile test, and methods of sampling, to conform to F. S. B. Spec. 339 for metals.

References.—Methods of testing, general requirements for metals. *See also* 600.1. 646.0. Brass and bronze ingot metals for bearings. *See* 644.11.

692.3 METAL BEARINGS

American Electric Railway Engineering Assn. E2–27; 1927. Journal Boxes and Contained Parts. Standard design and dimensions for journal boxes, bearings, wedges, and dust guards for 6 sizes of bearings.

American Electric Railway Engr. Assn. E12–26; 1926. Standard Gages for Journal Bearings and Wedges. Dimensional drawings.

American Railway Assn. Mechanical Div. Recommended Practice; 1926. Bearings, Journal, Lined. Construction, chemical analysis of brass back and of bearing metal lining, appearance of fracture.

American Railway Assn. Mechanical Div. Journal Bearings; 1920. Dimensions and design for 6 standard sizes, for lined journal bearings.

American Railway Assn. Mechanical Div. Recommended Practice. Journal Bearings, Minimum Thickness for Backs of; 1921. Minimum thicknesses for backs for 6 sizes of bearings.

American Railway Assn. Mechanical Div. Journal Bearing Gages and Journal Wedge Gages for Journals A to F; 1930. Dimensions and design.

American Society for Testing Materials B 67–28; 1928. Car and Tender Journal Bearings, Lined. Chemical composition and test requirements for backing and for lining, backing of tin-lead-copper, lining of tin-antimony-lead, fracture and chipping test requirements, permissible variations in specified dimensions.

References.—Bearing metals. *See* 692.1, 692.2. Journal boxes. *See* 611.22. Ball and roller bearings. *See* 766.2.

693. SOLDERS

693.1 SOLDER (TIN-LEAD BASE)

American Railway Assn. Telegraph and Telephone Section. 2–G–20; 1926. Rosin Core Solder. Construction, composition requirements for 38 per cent tin solder, percentage of commercial rosin, dimensions of finished solder.

American Society for Testing Materials B 18–21; 1921. Approved by American Standards Assn. as K 5–1922. Methods of Chemical Analysis of Alloys of Lead, Tin, Antimony and Copper. Methods apply particularly to babbitt metal and similar lead and tin base alloys. Two methods given of which one is slow but more accurate. Determination of lead, copper, antimony, tin and arsenic.

American Society for Testing Materials B 32–21; 1921. Approved by American Standards Assn. as H 11–1924. Solder Metal. Covers lead-tin alloys known as soft solder. Two classes and five grades for each class, dimensions of bars or ingots, chemical composition requirements and permissible variations, methods of sampling.

National Electric Light Assn. Suggested Specifications D970–28T; 1928. Tentative. Solder. To conform with current specifications of American Society for Testing Materials, requirements on percentages of tin, lead, and antimony for string and for wiping solder.

Society of Automotive Engineers 1931 Handbook. Solder; 1922. Melting points, chemical composition requirements for four grades of tin-lead solders of two classes, class A required for galvanized iron and zinc. First three grades are substantially same as A. S. T. M. Specification No. B32–21.

U. S. Gov., Federal Specifications Board 313; 1925. Tin-Lead Solder. For 5 grades of solder of which 3 grades are made of new metals, chemical composition requirements and method of sampling.

Grade A for use on galvanized iron and zinc where half-and-half solder ordinarily is used, grades B and C for galvanized iron and zinc, grade D for plumbing and wiping, grade E for dip work on auto radiators.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 692.0.

693.2 SOLDERS, COPPER-ZINC BASE

American Society for Testing Materials B 64–28; 1928. Brazing Solder. For two grades of copper-zinc solder, chemical composition and test, grain size requirements for three grades of grain and for lump solder.

Society of Automotive Engineers 1931 Handbook. Brass Wire; 1924. Suitable for brazing and torch welding, chemical composition requirements for soft annealed wire.

Society of Automotive Engineers 1931 Handbook. Brazing Solder; 1922. Chemical composition requirements for brass brazing solder, information on melting point.

U. S. Gov., Federal Specifications Board 306; 1925. Spelter Solder (for brazing). Chemical composition requirements for 2 grades of solder in granulated form and 2 grades in ingot, bar, or wire form, the latter two being suitable to parts to be subjected to heat treatment after brazing, main constituents copper and zinc.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11. Brass welding rod. *See* 645.11.

693.3 SILVER SOLDER

American Society for Testing Materials B 73–29; 1929. Silver Solders. For 8 grades of silver-copper-zinc alloys in wire, strip, sheet or granular form for brazing purposes, manufacture, chemical composition, and sampling requirements.

American Society for Testing Materials. Tentative Standard B 81–31T; 1931. Methods of Chemical Analysis of Silver Solders. Test procedure for determination of silver, copper, cadmium, zinc, tin, lead, iron, and nickel.

U. S. Gov., Federal Specifications Board 307; 1925. Silver Solder. Chemical composition requirements for 3 grades of silver-copper-zinc alloy solder, for ordinary and high strength applications but not for dental purposes, maximum dimensions of strips.

References.—Methods of testing, general requirements for metals. *See also* 600.1, 644.11.

693.4 SOLDERS FOR ALUMINUM

695. MAGNESIUM AND MAGNESIUM ALLOYS

American Society for Testing Materials. Tentative Specifications B 80–31T; 1931. Magnesium Base Alloy Castings. Requirements on chemical composition and tension test for 3 grades, including strength requirements for heat treated castings.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Other light alloys of aluminum. *See* 631.11, 631.41. Magnesia pipe coverings. *See* 707.43. Chemical compounds of magnesium. *See* 839.39.

696. ORES, METALS, AND ALLOYS NOT ELSEWHERE CLASSIFIED

American Society for Testing Materials. A 97–27; 1927. Tungsten Powder. Chemical composition requirements, with recommendation for use of A. S. T. M. standard methods of sampling and chemical analysis for ferro-alloys, A 103 and A 104.

References.—Methods of testing, general requirements for metals. *See also* 600.1. Ferro-tungsten. *See* 621.25.

700–799 MACHINERY AND VEHICLES

700–709 POWER GENERATING EQUIPMENT, EXCEPT ELECTRICAL

700. GENERAL ITEMS

American Railway Assn. Purchases and Stores Div. Standard Material Classification; 1922. Classification of the materials used by railroads under main numbered headings with detail lists of materials under each heading and the unit in which purchased.

American Society of Mechanical Engineers. Power Test Code. Definitions and Values; 1931. Fundamental units and constants, definitions of units of load and of performance, notes on data and computation of test codes.

American Society of Mechanical Engineers. Power Test Code. General Instructions; 1929. Instructions common to all the power test codes, object of test, preparation, testing apparatus, starting and operating conditions, records, working up data, and report.

American Society of Mechanical Engineers. Power Test Codes. Instruments and Apparatus, Part 13; 1930. Speed Measurements. Descriptions, principles of operation, relative advantages, installation rules, range and accuracy, precautions in taking readings, for continuous counters and hand counters with watch, tachoscopes, speed indicators, centrifugal tachometers and electric tachometers, stroboscopes.

American Society of Mechanical Engineers. Symbols for Heat and Thermodynamics; 1931. Approved by American Standards Assn. as Z10c–1931. Sponsor organizations, American Assn. for Advancement of Science, American Institute of Electrical Engrs., American Society of Civil Engrs., Society for Promotion of Engineering Education, Am. Soc. Mech. Engrs. Covers general symbols, symbols for specific volume, specific heat, thermodynamic properties and quantities, symbols for saturation, vaporization, heat transmission, etc.

References.—Temperature measurements. *See also* 919.80. Density determination of solids, liquids, and gases. *See also* 503.0. Liquid fuels. *See* 503.0. Coal and coke. *See* 501. Tolerances, allowances, and gages for metal fits. *See also* 615.82. Heat transmission measurements. *See* 792.0.

701. STEAM ENGINES AND LOCOMOTIVES

701.1 STEAM ENGINES

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steam Engines. For reciprocating engines and turbines, parts which require steel forgings, strength and bend test requirements for materials, structural features, design formulas to be used for shafting, crankshaft webs, propeller shaft, and coupling bolts, hydrostatic test requirements for cylinders, condenser, evaporator.

American Society of Mechanical Engineers. Power Test Code. Reciprocating Steam Engines; 1926. Applies to tests for determining the performance of the engine alone apart from that of independently driven auxiliaries and of feed water heaters or heat reclaiming apparatus. Required measurements, preparations, operating, forms for tabulation of data and calculations.

American Society of Mechanical Engineers. Power Test Code. Reciprocating Steam-Driven Displacement Pumps; 1925. Applies to tests for performance of pump and engine, including heaters, jacket pumps, circulating, condensate, or vacuum pumps which are concerned in their operation. Required measurements, preparatory tests, starting and stopping instructions, calculations, forms for tabulation and calculations for efficiency and duty.

References.—Donkey engines. *See* 703.1. Other ship engineering specifications. *See* 725.42. Steel forgings, shafts. *See also* 611.51, 611.52. General requirements on power test codes. *See* 700. Gaskets, rod packing. *See* 707.1, 707.2.

701.2 STEAM TURBINES

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steam Engines. For turbines, parts which require steel forgings, strength and bend test requirements for materials, structural features, design formulas for shafting, propeller shaft, and coupling bolts, hydrostatic test requirements for condenser and evaporator.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Propelling turbines for electric propulsion. For direct current and for alternating current drive, recommendations on provision of and operating features for governor, overspeed release, throttle valve and trip, automatic shut-off for auxiliary exhaust, limiting means for steam flow to turbine.

American Society of Mechanical Engineers. Power Test Code. Steam Turbines; 1928. Instructions and tests to determine the thermal-economy characteristics of the turbine (the heat rate, or, for simple turbines, the steam rate) and the capacity, classification of turbines, essential data, definition and measurement of net output, determination of total steam, condition of steam, conduct of test, forms for tabulating data and calculations.

Associated Factory Mutual Fire Insurance Companies. Centrifugal Fire Pumps; 1931. Steam turbine for driving pump, requirements on steam consumption and speed, provision of and operating requirements for safety valve, speed governors, and pressure regulators, material and speed test of turbine rotor, material and structural features of shaft, critical speed of shaft, installation rules.

References.—Steel forgings, shafts. *See also* 611.51, 611.52. Cast iron, cast steel. *See also* 611.11, 611.41. General requirements on power test codes. *See* 700. Speed governors. *See* 795.

701.3 LOCOMOTIVES

American Railway Assn. Mechanical Div. Recommended Practice. Brackets and Other Means of Support for Air Pumps, Water Pumps, Power Reverse Gears, Feedwater Heaters, etc., on Locomotives; 1930. General types of sheet steel, bar, or cast steel brackets and methods of attachment.

American Railway Assn. Mechanical Div. Efficiency Tests of Locomotives, Method of Conducting; 1914. Methods of conducting laboratory test and road test for determining steam and coal consumption per unit of power, testing apparatus and method of attachment, test data sheets and computation forms for calculating horsepower, boiler efficiency, etc.

American Railway Assn. Mechanical Div. Recommended Practice. Rules for Determining Stresses in Locomotive Boilers; 1915. For new construction, rules for determining stresses in longitudinal barrel seams and patches, longitudinal gusset braces and flat surfaces, and in stay bolts.

American Railway Assn. Mechanical Div. Recommended Practice; 1930. Tractive Power for Locomotive Booster. Formula recommended for computation of tractive effort of booster.

American Railway Assn. Mechanical Div. Tractive Power for Mallet Locomotives; 1924. Formulas for computing tractive power of 4 cylinder locomotives, simple or compound, for 90 and 50 per cent cut-off.

American Railway Assn. Mechanical Div. Recommended Practice. Tractive Power for Three Cylinder Simple Locomotives; 1926. Formula for computing tractive power for maximum valve cut off from 90 to 50 per cent.

American Railway Assn. Mechanical Div. U. S. Safety Appliances for All Classes of Cars and Locomotives; 1928. For compliance with safety appliance act, requirements on number, dimensions, location, and manner of application of hand brakes, running boards, steps, ladders, handholds, uncoupling levers, and safety railings, with dimensioned drawings.

American Society of Mechanical Engineers. Boiler Construction Code. Section III; 1927. Boilers of Locomotives. Selection of materials, ultimate strengths of materials to use, minimum thickness of plates and tubes, construction and maximum allowable working pressures for boilers, boiler joints, braced and stayed surfaces, requirements as to riveting, safety valves, fittings and appliances, hydrostatic pressure tests of boiler.

American Society of Mechanical Engineers. Power Test Code. Steam Locomotives; 1926. Applies to both laboratory and road tests of simple two cylinder locomotive using superheated steam. Measurements required, preparation for test, installation of testing apparatus, starting and stopping instructions, methods of calculating the various items, forms for tabulating test data and calculations for boiler, engine, and locomotive performance.

Railway Fire Protection Assn. Handbook; 1925. Locomotive Fire Hazards. Recommendations on fitting of front ends, on some design points and operation of ash pans, starting and operation of oil burners and recommended mesh and wire size of spark screens for oil burning locomotives.

U. S. Gov., Congress. Public, No. 113; 1893. amended 1896. An act to promote the safety of employees and travelers upon railroads by compelling common carriers engaged in interstate commerce to equip their cars with automatic couplers and continuous brakes and their locomotives with driving-wheel brakes, and for other purposes. Besides above, there are requirements for appliances on locomotives for operating the train brake system, provision of grab irons and handholds, and standard height of drawbars.

U. S. Gov., Congress. Public, No. 165; 1908. An act to promote the safety of employees on railroads. Requires locomotives of common carriers to be equipped with ash pans, which can be dumped, emptied or cleaned without the necessity of any employee going under such locomotive.

U. S. Gov., Dept. of Commerce, Bureau of Standards H5; 1923. Approved by American Standards Assn. as B 13–1924. American Logging and Sawmill Safety Code. For steam locomotives for logging railroads, requirements on minimum allowed factor of safety, number, general location, and protection of water glasses, gauge (try) cocks, and gauges, capacity and type of safety valves, design and dimensions of footboards and handrails, equipment requisites in lamps, sand boxes, spark arrestors, and ash pan.

U. S. Gov., Interstate Commerce Commission. Bureau of Locomotive Inspection. Laws, Rules, and Instructions for Inspection and Testing of Steam Locomotives and Tenders and Their Appurtenances; 1929. Also interpretations, rulings and explanations on questions raised regarding above laws, rules, and instructions; 1921. Requirements, mandatory by law, for new locomotives and for locomotives in service, as regards permissible factor of safety for boiler, allowable stress on boiler stays and braces, design strength of material and rivets, interior and exterior inspection, hydrostatic pressure test, stay bolt testing, location, siphon connection, and testing of steam gauges, number, capacity, and test of safety valves, number and location of water glass and gauge cocks, provision of glass shields, method of support and height of ash pan, testing of air brake compressors and reservoirs, maximum piston travel for brakes, windows and curtains for cabs, cab apron, provision of mechanically operated fire door, safety chains for draw gear, fit in main and side rod bearings, headlight illumination intensity, cab lighting, minimum diameter of axles for various loads, permissible play in wheel bearings, clearance of pilot, gage of wheels and their pressing on axles, gangway of tender and relative deck height, etc., permitted wear limits and defects appearing in service.

U. S. Gov., Interstate Commerce Commission. Bureau of Locomotive Inspection. Laws, Rules, and Instructions for Inspection and Testing of Steam Locomotives and Tenders and Their Appurtenances; 1929. Safety Appliance Standards for Locomotives. Requirements, mandatory by law, regarding number, dimensions, location, and application of sill steps, handholds, uncoupling levers, running boards, and handrails, provision of automatic couplers and of hand-brakes, standard height of draw-bars.

References.—Electric locomotives. *See* 721.1. Boiler plates. *See* 604.11. Copper plates for locomotive fireboxes. *See* 641.21. Staybolt and engine bolt iron bars. *See* 603.1. Copper bars for locomotive staybolts. *See* 641.12. Boiler tubes. *See* 703.2. Structural steel for locomotives. *See also* 605.13. Locomotive cylinders. *See* 702.1. Locomotive frames. *See* 702.2. Misc. locomotive parts. *See* 702.9. Misc. boiler accessories. *See also* 703.9. General requirements for power test codes. *See* 700. Classification of material. *See* 700. Valve stem packing. *See* 707.2.

702. ACCESSORIES AND PARTS FOR STEAM ENGINES AND LOCOMOTIVES

702.0 GENERAL ITEMS

Assn. of Iron and Steel Electrical Engineers. Suggested Rules for Guidance in Operation of Engine Stops; 1923.

702.1 CYLINDERS FOR STEAM LOCOMOTIVES

American Railway Assn. Mechanical Division. Cylinders and Cylinder Parts, Cast Iron for Locomotives; 1918. Covers cylinders and cylinder bushings, piston valve bushings, packing rings and bull rings, piston packing rings and piston head or bull rings. Chemical composition, transverse and chill test requirements.

American Railway Assn. Mechanical Div. Recommended Practice. Pressures for Applying Steam Chest and Cylinder Bushings; 1930. Requirements on fit allowances for cast iron bushings, material in accordance with A. R. A. specifications for locomotive cylinders and cylinder parts.

American Society for Testing Materials. A 45–14; 1914. Cast-Iron Locomotive Cylinders. Chemical composition and tests, requirements for transverse test and for fracture test of chilled specimen. Available in Spanish and French from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

References.—Gray cast iron. *See also* 611.11. Methods of testing cast iron. *See also* 600.1.

702.2 FRAMES FOR STEAM ENGINES AND LOCOMOTIVES

American Society for Testing Materials A 87–27; 1927. Carbon Steel Castings for Railroads. For locomotive and car equipment and miscellaneous use, grade A annealed and unannealed, grade B for highly stressed truck side frames, bolsters, couplers, locomotive frames of annealed steel castings, chemical composition and tests, tension test requirements.

References.—Cast steel. *See also* 611.41. Methods of testing metal. *See also* 600.1.

702.9 MISCELLANEOUS PARTS FOR STEAM ENGINES AND LOCOMOTIVES

American Railway Assn. Mechanical Div. Checking Formulas for Main and Side Rods; 1914. Standard formulas for calculating stresses in locomotive main and side rods.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. Crosshead or Wrist Pin. Recommended design and dimensions for several sizes of crosshead pin with maximum recommended pressure on pin, of forged steel according to A. R. A. specifications, type of lubrication.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. Crossheads and Guides for Locomotives. Recommends alligator type crosshead and guides, made of cast steel, recommended methods of lubrication and of taking up wear, design recommended, material according to A. R. A. specifications.

American Railway Assn. Mechanical Div. Recommended Practice. Dry Pipes; 1922. For locomotives, recommended diameters and thickness of 5 sizes of dry pipes.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. Front and Back Cylinder Heads for Locomotives. Recommended design of cast steel cylinder heads for cylinders up to 32 inches in diameter and boiler pressures up to 300 pounds, material according to A. R. A. specifications.

American Railway Assn. Mechanical Div. Recommended Practice. Injectors, Dimensions for Flange and Screw Couplings for; 1916. Recommended standard form and dimensions of threads for 1- to 3-inch iron or copper pipe connections, form and dimensions of flange couplings, of coupling nuts and sleeves.

American Railway Assn. Mechanical Div. Recommended Practice; 1929. Knuckle Joints for Locomotive Side Rods. Recommended design and dimensions of forged steel pins and rod ends, maximum bearing paper, material according to A. R. A. specifications.

American Railway Assn. Mechanical Div. Recommended Practice. Locomotive Rods for Heavy Power; 1923. Recommendations on general design features.

American Railway Assn. Mechanical Div. Recommended Practice. Main and Other Crank Pins for Locomotives; 1928. Recommended designs and arrangements, dimensions and maximum fiber stresses and bearing pressures, for several pin sizes.

American Railway Assn. Mechanical Div. Recommended Practice. Piston Rod and Key Taper in Crosshead; 1923. Two standard recommended tapers for holes in crosshead for accommodating piston rod and piston rod key.

American Railway Assn. Mechanical Div. Recommended Practice. Pistons and Heads for Locomotives; 1928. Recommended dimensions and design of standard cast or wrought steel piston head of conical type, strength requirements for steel, for several sizes of cylinders.

References.—Locomotives. *See* 701.3. Cast iron, cast steel. *See also* 611.11, 611.41. Cast-iron wheels, cast-steel wheels. *See* 611.18, 611.49. Forged-steel wheels and tires. *See* 611.53. Journal boxes, bearings. *See also* 611.22, 692.3. Brake beams, brake shoes. *See also* 611.42 and 611.43. Couplers and cast-steel parts. *See also* 611.44, 611.49. Axles. *See also* 611.52, 611.51. Valves, safety valves. *See also* 607.6. Hose. *See* 202. Lubricator fittings. *See* 794. Boiler accessories. *See also* 703.9. Locomotive headlights. *See* 716.2. Power Piping. *See* 607.0.

703. BOILERS, FURNACES, EVAPORATORS, CONDENSERS

703.0 GENERAL ITEMS

American Electric Railway Engr. Assn. G1–24; 1924. Standard Boiler Code of A. S. M. E.; 1918 edition of A. S. M. E. Boiler Code approved as the standard of this organization.

American Marine Standards Committee. O No. 6–1926. General Instructions for Operation, Care, and Upkeep of Scotch Type Marine Boilers. Instructions on lighting off a boiler, on water level and feeding boiler, on raising steam and cutting in boilers, operation, on cutting out boilers, on safety precautions, and care and upkeep for both coal fired and oil fired boilers.

American Marine Standards Committee. O No. 14–1927. General Instructions for Operation, Care, and Upkeep of Water-Tube Marine Boilers. Instructions on lighting off a boiler, on water level and feeding boiler, on raising steam and cutting in boilers, operation, on cutting out boilers, on safety precautions, and care and upkeep for both coal fired and oil fired boilers.

American Marine Standards Committee. O No. 26–1930. Care and Operation of Oil-burning Apparatus and Handling of Fuel Oil on Ships. Gives briefly the characteristics of fuel oil, describes the equipment for the use of fuel oil, with general instructions for its safe and proper operation, with notes on hazards in oil tanks, as regards danger of gases from standpoint of flammability and asphyxiation.

American Petroleum Institute. Code No. 2; 1928. Recommended Field Practice for Oil Field Boilers. Installation requirements for firebox type and horizontal return tubular boiler settings, for stacks, pipe, water and steam gauges, safety valves, steam, blow-off, feed water, and fuel piping, fuel burners; operation, firing and cutting in, cutting out, cleaning boiler.

American Society of Mechanical Engineers. Boiler Construction Code; 1930. Section VI. Suggested Rules for the Inspection of Material for Boilers and of Steam Boilers. For new boilers the inspection of material and construction at the factory, inspection after installation and hydrostatic test; for installed boilers, inspection of scale, corrosion, fire surfaces, joints, tubes, fittings, etc.

American Society of Mechanical Engineers. Boiler Construction Code; 1927. Section VII. Suggested Rules for the Care of Power Boilers.

Rules for putting boilers in service, for handling boilers in service, for handling boilers out of service, rules for operating and maintaining boiler appliances, rules for routine inspection, rules for the prevention of direct causes of boiler failures including overpressure, overheating, feed water supply, corrosion, partial rules for boiler installation, tests for chemical treatment of feed water.

American Society of Mechanical Engineers. Test Code for Atmospheric Water Cooling Equipment; 1930. For cooling large amounts of water for power or industrial purposes, such as cooling towers, spray nozzle installations, ponds and reservoirs, objects for which tests may be necessary, requirements on types and location of instruments and test apparatus, test data sheets, calculation of results.

American Society of Mechanical Engineers. Power Test Code. Condensing Apparatus; 1925. Types of condensers, starting and stopping test, calculation of heat supplied and heat transferred, forms for tabulation of data and results.

American Society of Mechanical Engineers. Power Test Code. Evaporating Apparatus; 1925. For use in testing evaporators, with or without vacuum used in concentrating solutions or distilling by transfer of heat through metal walls from one fluid to another. Measurements required for apparatus heated by steam, starting and stopping instructions, methods of calculating heat transfer, total evaporation, heat balance, forms for tabulating test data and calculations.

American Society of Mechanical Engineers. Power Test Code. Feedwater Heaters; 1925. Applies to open or closed boiler feedwater heaters. Objects for which tests may be run, formula for calculating heat transfer coefficient, forms for tabulating test data and calculations.

American Society of Mechanical Engineers. Power Test Codes. Instruments and Apparatus, Part 11; 1930. Determination of Quality of Steam. Descriptions, principles of operation, illustration of types, relative advantages, range and accuracy, installation rules, calculation of results, corrections, calibration, for throttling calorimeters, separating calorimeters, universal calorimeters, superheating calorimeters, electric calorimeters; instructions for the design and location of sampling nozzles.

American Society of Mechanical Engineers. Power Test Code. Instruments and Apparatus. Part 21, Leakage Measurement, chapter 1, Condenser Leakage Tests; 1928. Procedure for making leakage tests by qualitative silver nitrate method, by quantitative silver nitrate method, by short direct-weight method, by standard direct weight method, by electrolytic-conductance method and the specific cases in which each is applicable for fresh and salt circulating water.

American Society of Mechanical Engineers. Power Test Code. Stationary Steam Generating Units; 1930. Applies to boiler, fuel burning apparatus, superheaters, and economizers, but not to the apparatus required for their operation. Measurements required, instructions for starting and stopping test with hand or stoker firing, forms for test data and computations for efficiency and heat balance of boiler and combinations of boiler with superheater, economizer and air heater, for solid, liquid and gaseous fuels.

National Electric Light Assn. Suggested Code Publ. 289–58; 1929. Operating Code Manual. Covers operation, care, and maintenance of boiler plant, boilers, coal handling equipment, pulverized coal auxiliaries, fans, boiler feed pumps, feed water heaters, evaporators, turbines, reciprocating engines, engine room auxiliaries, etc.

National Electric Light Assn. Proceedings, vol. 80, p. 373; 1923. Suggested Standards. Rules for General Operation of Stoker Fired Boilers. Covers rules for inspection, general operation, putting a boiler on line, dumping, operation of clinker crushers, procedure for high water, for low water, priming, hot stoker rams, holes in fire, broken gauge glass, shutting down boiler, taking off line, etc.

703.1 BOILERS AND DONKEY ENGINES

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Boilers. Design formulas for working pressure, efficiency of riveted joints, thickness of plates, riveting, thickness of tubes, valve and gauge equipment, hydrostatic test, tensile and bend test requirements for plates, stays and rivet stock, flange, flattening and hydrostatic test for tubes, strength test of castings, etc.

American Marine Standards Committee. E No. 26–1929. Marine Boilers and Pressure Vessels. For internally fired fire tube boilers and for water tube boilers, rules for design and construction, including formulas for working pressure, dimensions and design of cylindrical shells, riveted joints, flat surfaces, tubes, furnaces, etc., required safety factor, accessory requirements, etc.

American Petroleum Institute. Standard No. 2; 1930. Specifications for Oil Field Boilers. (locomotive type). To meet test requirements of A. S. M. E. Boiler Code, standard sizes, definition of horsepower, special construction, standard openings and fittings, stack and flange dimensions, etc.

American Society of Mechanical Engineers. Boiler Construction Code. Section I, Power Boilers; 1930. Selection of materials for various parts, specified ultimate strengths of materials, minimum thicknesses of plates and tubes, allowable working pressures for steel and wrought iron tubes, and for copper tubes, thickness of steam piping of steel, iron, brass, or copper construction and allowable working pressures for boilers, for riveted and welded joints, for ligaments, for domes, dished heads, braced and stayed surfaces, for tube sheets of combustion chambers, requirements as to manholes, safety valves, water glasses and steam gauges, fittings and appliances, specifications for boiler settings and for hydrostatic pressure tests.

American Society of Mechanical Engineers. Boiler Construction Code. Section IV; 1927. Boilers Used Exclusively for Low-Pressure Steam Heating, Hot-Water Heating, and Hot-Water Supply. Cast-Iron Boilers. (Does not include range boiler and gas water heaters for the production of domestic hot-water supply.) Working pressure and temperature limits, requirements as to boiler openings, installation, fittings and appliances, and hydrostatic tests.

American Society of Mechanical Engineers. Boiler Construction Code. Section V; 1927. Miniature Boilers. Definition, allowable working pressure, material and construction requirements, fittings and appliances.

U. S. Gov., Dept. of Commerce, Bureau of Standards H5; 1923. Approved by American Standards Assn. as B 13–1924. American Logging and Sawmill Safety Code. For donkey engines and boilers, requirements on minimum factor of safety, number, general location, and protection of water glasses, gauge (try) cocks, and gauges, capacity and type of safety valve, guarding of engine moving parts.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors;

1929. (4 manuals for ocean, bay, lake, and river vessels.) Boilers and Attachments. For use on steam vessels, mandatory requirements on computation of allowable steam pressure, on punching and drilling of holes, size and reinforcement of manholes, hydrostatic pressure test, design of steam chimneys, riveted joints, stiffeners, and stays, permissible pressures on combustion chamber bottoms and tube sheets, design of furnaces and flues, quality and test of boiler tubes, number and location of fusible plugs, gauges, and other appurtenances, design and test of safety valves, permissible pressures and hydrostatic test requirements for water tube boilers.

References.—Locomotives. *See* 701.3. House heating boilers. *See* 614.4. Fire brick. *See* 534.12. Boiler plates. *See* 604.11. Staybolt iron bars. *See* 603.1. Boiler tubes, boiler accessories. *See* 703.2, 703.9. Boiler rivets. *See* 608.4. Operating practice and installation. *See* 703.0. Test codes and inspection rules. *See* 700., 703.0. Boiler gaskets. *See* 707.11.

703.2 BOILER TUBES

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Boiler tubes. For lap-welded tubes and seamless tubes, requirements on flange test, flattening or crushing test, and hydrostatic pressure test.

American Electric Railway Engr. Assn. Recommended Specification G100–24; 1924. Specifications for Lap-Welded and Seamless Steel and Lap-Welded Iron Boiler Tubes. (Identical with A. S. T. M. tentative specification A 83–22T.) Covers boiler tubes, boiler flues, superheater tubes, safe ends and arch tubes. Material, chemical properties and tests, flange, flattening, crush, hydrostatic, and etch tests, standard weights of boiler and small superheater tubes.

American Railway Assn. Mechanical Division. Recommended Practice; 1926. Tubes, Boiler, Lap-Welded and Seamless Steel for Locomotives. Chemical analysis, flange, flattening, and hydrostatic test requirements, standard weights and permissible variations.

American Railway Assn. Mechanical Division. Recommended Practice; 1926. Tubes, Boiler, Lap-Welded Charcoal Iron for Locomotives. Expansion, crush, hydrostatic, etch, and flange test requirements, standard weights and permissible variations.

American Society for Testing Materials. A 83–30; 1930. Lap-Welded and Seamless Steel and Lap-Welded Iron Boiler Tubes. Chemical composition and tests, flange, flattening, crush, hydrostatic, and etch test requirements, standard weights. 1924 edition available in Spanish and Portuguese from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. B 13–18; 1918. Seamless Copper Boiler Tubes. For locomotive boilers. For arsenical and nonarsenical grades, chemical composition requirements, methods of sampling, flange, crush, and hydrostatic test requirements, standard weights and permissible variations.

American Society for Testing Materials. B 14–18; 1918. Seamless Brass Boiler Tubes. For locomotive boilers, requirements on chemical composition, flange, flattening, and hydrostatic tests, standard weights and permissible variations.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Boiler Tubes. For use in boilers on steam vessels, mandatory requirements on general quality, flattening test, flanging test, and hydrostatic pressure test.

U. S. Gov., Federal Specifications Board 347; 1925. Lap-Welded and Seamless Steel Boiler Tubes. Suitable for boiler tubes, boiler flues, superheater tubes, safe ends, arch tubes. Chemical composition, hydrostatic test, flange test, and flattening test requirements, standard weights and dimensions and permissible variations.

U. S. Gov., Federal Specifications Board 349; 1925. Lap-Welded Charcoal Iron Boiler Tubes. Suitable for boiler tubes, boiler flues, superheater tubes, safe ends and arch tubes. Standard weights and dimensions and permissible variations, hydrostatic test, flange test, flattening test, and etch test requirements.

References.—Methods of testing and general requirements for metals. *See* 600.1. Methods of testing copper and brass. *See also* 641.0 and 644.11.

703.9 MISCELLANEOUS BOILER AND CONDENSER ACCESSORIES

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Steam Engines. Includes for condenser and evaporator, requirements on hydrostatic tests.

American Marine Standards Committee. O No. 26–1930. Care and Operation of Oil-Burning Apparatus and Handling of Fuel Oil on Ships. Gives briefly the characteristics of fuel oil, describes the equipment for the use of fuel oil, with general instructions for its safe and proper operation, with notes on hazards in oil tanks from standpoint of flammability and asphyxiation properties of the gases.

American Railway Engineering Assn. 1929. Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Includes steam separator as part of steam power equipment, average efficiency test requirements for separator with 66 per cent quality steam.

American Society of Mechanical Engineers. Boiler Construction Code; 1930. Section VIII. Unfired Pressure Vessels. Specifications of safety valves, allowable design stresses in materials, construction and allowable working pressures of vessel, riveted joints, dished heads, braced and stayed surfaces and openings, vessel supports, hydrostatic pressure test, rules for fusion process of welding, for forge welding, for brazing, requirements for enameled pressure vessels.

Associated Factory Mutual Fire Insurance Companies. Fuel Oil Installations for Furnaces and Engines; 1928. Includes precautions to be observed in the installation of fuel oil burners, as regards reheating and atomizing the oil, the use of automatic interlocking valves and the arrangement of furnaces.

National Board of Fire Underwriters. National Fire Protection Assn., U. S. Dept. of Agriculture. Sponsors. Approved by American Assn. as Z 12a–1930. Installation of Pulverized Fuel Systems. Construction requirements of building to take care of fire and explosion hazard, area of thin glass construction, methods of ventilating and removing dust, installation requirements and structural features of pulverizers, separators, electrical equipment, dust collectors, blowers, driers, storage and furnace bins, piping, fire protection.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Evaporators, Feed Water Heaters, Separators, and Steam Traps. For use on steam vessels, when made of cast iron, mandatory requirements on strength of material, allowable working pressure, minimum thickness of parts, permissible stress on bolts, provision of safety valve on evaporator.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Fusible Plugs. For use on marine boilers, mandatory requirements on shape and dimensions of bored bronze casing and on chemical composition of fusible material in bore.

References.—Brass, Muntz metal, and admiralty metal condenser tubes. *See* 645.24. Muntz metal condenser tube plates. *See* 644.21. Condenser tube packing. *See* 707.23, 707.25. Cast iron. *See* 611.11. Test codes for various steam plant accessories and equipment. *See* 703.0. Oil burner ignition transformers. *See also* 713.5.

704. OIL ENGINES

704.0 GENERAL ITEMS

Associated Factory Mutual Fire Insurance Companies. Fuel Oil Installations for Furnaces and Engines; 1928. Includes recommendations for oil engine installations, oil feed piping, and exhaust piping with special reference to fire hazards.

National Board of Fire Underwriters. Internal Combustion Engines and Coal Gas Producers; 1922. For engines, location of engine, location and connections to fuel tank, materials and installation of fuel piping, exhaust piping and muffler, permissible types of construction for mixing fuel, ignition, and starting, gas pressure regulators, gas bags, etc.

Society of Automotive Engineers 1931 Handbook. Diesel Engine Testing Forms; 1931. Definition of rated horsepower, rules for measuring brake loads, fuel consumption, temperatures, speed, friction horsepower, computation of indicated horsepower; forms for listing structural features of engine; curve sheets for plotting horsepower, torque, mechanical and thermal efficiencies, and fuel consumption against speed.

704.1 OIL ENGINES

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Internal Combustion Engines. Requirements on types of materials for various parts, physical test requirements for steel forgings, steel castings, and cast iron, design formulas for crank shafts for Diesel and for explosion combustion engines, design formulas for line shafts and propeller shafts, requirement for auxiliaries.

American Institute of Electrical Engrs. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Diesel Engines for electric drive. Recommendations on provision of quick acting governor to stop flow of oil, recommended maximum no-load speed as percentage of full-load rated speed.

Diesel Engine Manufacturers Assn. Standards; 1930. For Diesel engines, standard practice in correction of ratings for high altitudes, standard conditions and heat value of fuel for fuel guarantees, minimum equipment of stationary engines and of marine engines, standard definitions of terms encountered in Diesel engine practice, notes on selection and installation of Diesel engines.

Underwriters Laboratories. Electric Lighting Plants; 1921. Includes oil engines connected to electric generators; for supply tanks, capacity, location, materials, and wall thickness, construction of joints and connection, fill and vent openings, and pressure-test requirements; for engines, general construction and location of fuel cup or mixing valve, fuel feed, fuel line valves, strainer, muffler, fuel piping and fittings, acceptable methods of ignition and of supply of ignition gasoline.

Underwriters' Laboratories. Internal Combustion Engines, Stationary and Portable; 1920. Covers gas, gasoline, kerosene, and fuel oil engines, capacity, location and installation of tank, general design of inside tanks, materials, thickness of metal, construction of joints, connections and openings, pressure test requirements, general design and materials for fuel feed cup, carburetor or mixing valve, of fuel valves, strainer, fuel piping, exhaust piping and muffler, gas regulator and gas bag, acceptable types of ignition.

References.—Installation and fuel supply. *See also* 704.0, 705.0. Cast iron, cast steel, forged steel. *See also* 611.11, 611.41, 611.51, and 611.52. Testing forms. *See* 704.0. Test code for internal combustion engine. *See* 705.0. Metal fits. *See* 615.82.

705. GASOLINE ENGINES AND GAS ENGINES

705.0 GENERAL ITEMS

American Society of Mechanical Engineers. Power Test Code. Internal Combustion Engines; 1929. Applies to the engines only, auxiliaries essential to the operation of the engine must be tested under the appropriate code and the results in horsepower absorbed introduced and used in this code. Measurements required and those useful in determining performance characteristics, preparation for test, instructions for starting and stopping, calculation of thermal efficiency, itemized forms for the tabulation of test data and calculations for constant speed and variable speed and torque tests.

National Board of Fire Underwriters. Internal Combustion Engines and Coal Gas Producers; 1922. For engines, location of engine, location and connections to fuel tanks, materials and installation of fuel piping, exhaust piping and muffler, permissible types of construction for mixing fuel, ignition, and starting, gas pressure regulators, gas bags, etc.

Society of Automotive Engineers 1931 Handbook. Gasoline Engine Testing Forms; 1931. Rules for measuring brake loads, fuel consumption, temperatures, speed, friction horsepower, and computation of indicated horsepower; forms for listing engine structural features, computing of efficiency, etc., curves for plotting torque, horsepower, and mechanical efficiency against speed, fuel economy and thermal efficiency against horsepower.

Underwriters' Laboratories. Internal Combustion Engines, Stationary and Portable Types; 1920. Covers gas, gasoline, kerosene, and fuel-oil engines, capacity, location and installation of tank, general design of inside tanks, materials, thickness of metal, construction of joints, connections and openings, pressure test requirements, general design and materials for fuel feed cup, carburetor or mixing valve, of fuel valves, strainer, fuel piping, exhaust piping and muffler, gas regulator and gas bag, acceptable types of ignition.

705.1 AUTOMOBILE ENGINES

References.—Automobile engine parts and accessories. *See* 722.31, 722.32, 722.33. Test code and installation rules. *See* 705.0, 700.

705.2 MOTORBOAT ENGINES

References.—Motorboat requirements. *See* 725.3. Standard magneto mountings. *See* 705.5.

705.3 PUMPING ENGINES

American Petroleum Institute. Standard No. 11–C; 1930. Specifications for Internal Combustion Engines and Clutches for Oil Field Service.

Standard foundation bolt sizes, dimensions of reversible clutch and engine flywheel flange connections, and of exhaust and air intake opening connections, method of making horsepower rating test, procedure and forms for the rating test.

Associated Factory Mutual Fire Insurance Companies. Centrifugal Fire Pumps; 1931. Gasoline engine for driving pump, requirements on excess power, permissible speeds, excess speed test, inclosure of parts, accessibility, capacity of speed governor, lubrication, cooling system, double ignition, provisions for battery charging, trial run of engine, installation of engine and gasoline supply.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Stationary Engine Belt Speeds; 1923. Belt speeds for various engine horsepower ratings.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Stationary Engine Flywheel-Pulley Lugs; 1922. Dimensions of lugs on flywheel spokes for four diameters of bolt circles.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Water Pot or Hopper Capacities; 1921. Cooling water capacities for various engine ratings of stationary engines.

References.—Steam pumping engines. *See* 701.1. Test codes and installation rules. *See* 705.0, 700. Magneto mountings and governor. *See* 705.5.

705.4 GASOLINE ENGINES FOR ELECTRIC GENERATORS

Underwriters' Laboratories. Electric Lighting Plants; 1921. For isolated plant of internal combustion engine and electric generator with or without storage battery, including inside supply tank systems and outside supply tank systems; capacity, location, materials and wall thickness, construction of joints and connections, fill and vent openings, and pressure test requirements for tanks, general construction and location of carburetor, fuel feed, fuel line valves, strainer; material, size and arrangement of fuel piping and fittings, acceptable ignition methods for gasoline, kerosene and fuel oil engines, design of muffler and other accessories; for generator, type of enclosure, insulation of lead wires, temperature rise and dielectric strength test requirements; for switchboards, spacing of wiring insulation resistance and dielectric strength requirements.

References.—Test codes. *See* 705.0, 700. Magneto mountings and governor. *See* 705.5.

705.5 GASOLINE ENGINE ACCESSORIES AND PARTS

Society of Automotive Engineers 1931 Handbook. Farm Engine Governors; 1921. Requires belt operated engines to be equipped with governors and designed for attachment of speed indicators. No specification for governors.

Society of Automotive Engineers 1931 Handbook. Magneto Mountings; 1923. Dimensions of magneto coupling and shaft end, dimensions of magneto mounting for motorboat, motor truck, passenger car, large stationary engine and tractors, recommended dimensions for same for motorcycles, lighting plant, airplane and small stationary engine, dimensions of nonmagnetic shims.

References.—Automobile engine parts. *See also* 722.31, 722.32. Gaskets for gas engine exhaust and fuel and water connections. *See* 707.11.

705.6 AIRPLANE ENGINES

Society of Automotive Engineers. Aeronautic Safety Code; 1925. Approved by American Standards Assn. as D1–1925. Part 2, Powerplants. Requirements on use of dual ignition, starting means, design of intake system, engine characteristic test, durability test, idling test, overspeed test, and flight test, pressure tests and arrangement of fuel and oil tanks and piping, design and efficiency of cooling system, location and motion of engine controls.

U. S. Gov., Dept. of Commerce. Aeronautics Branch. Aero. Bull. 7–A; 1929. Airworthiness Requirements of Air Commerce Regulations. Requirements that must be met in order to be licensed by department for commercial use, including for engine, requirements on type of ignition, block tests, flight tests, tear-down inspection.

705.7 GASOLINE ENGINES FOR SHIP PROPULSION

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Internal Combustion Engines. Requirements on types of materials for various parts, physical test requirements for steel forgings, steel castings, and cast iron, design formulas for crank shafts for Diesel and for explosion combustion engines, formulas for line shafts and propeller shafts, requirements for auxiliaries.

References.—Test codes. *See* 705.0, 700. Cast iron, cast steel, steel forgings. *See* 611.11, 611.41, 611.51 and 611.52.

706. WATER WHEELS AND WATER TURBINES

706.0 GENERAL ITEMS

American Society of Mechanical Engineers. Power Test Code. Hydraulic Power Plants and Their Equipment; 1927. Includes both laboratory and field tests for the whole development or for any of the integral parts. Methods for measuring water in closed and open conduits, measurements of head, speed, and power, operating conditions, calculation of power and efficiency, itemized forms for tabulation of test data and calculations.

American Society of Mechanical Engineers. American Assn. for Advancement of Science. American Institute of Electrical Engineers. American Society of Civil Engineers. Society for Promotion of Engineering Education. Approved by American Standards Assn. as Z 10b–1929. Symbols for Hydraulics. Hydraulic engineering symbols including those used in design of water turbines and pumps.

706.1 WATER TURBINES

Machinery Builders Society. Testing Code; 1917. Covers acceptance tests on completed hydraulic turbines after installation in power plant. Requirements on methods of measuring power output by measurements on generator or by absorption dynamometer, measurement of head for inclosed and open flume turbines, measurement of quantity of water by weir, current meter, pitot tube, etc., use of model for efficiency tests.

References.—Speed governors for water turbines. *See* 795. Metal fits. *See also* 615.82.

706.2 TURBINE BUCKET WHEELS

707. PACKING, PIPE COVERINGS, AND GASKETS

707.1 GASKETS

707.11 Asbestos-Copper Gaskets

U. S. Gov., Federal Specifications Board. HH–G–71; 1931. Asbestos-Copper Gaskets, Corrugated. For asbestos lined pipe gaskets, requirements on minimum thickness of copper, purity and annealing of copper, content of asbestos in lining, inside diameters, compression test.

U. S. Gov., Federal Specifications Board HH–G–76; 1931. Asbestos Metallic Cloth Gaskets. For steam pressures up to 300 pounds, includes all folded gaskets for boiler manholes, handholes, and flanged joints, covers 2 grades of seamless and of jointed types of woven asbestos wire insertion cloth treated with rubber, requirements on number of plies, tolerance on thickness, bend test, size of brass or copper wire, content and quality of asbestos, weave, weight of metallic cloth and of rubber, steam pressure test, methods of test as specified in F. S. B. Spec. 59 for rubber goods.

U. S. Gov., Federal Specifications Board HH–G–101; 1930. Metallic Encased Gaskets. Covers asbestos copper jacketed gaskets for gas engine exhaust and other high-temperature applications; and cork copper jacketed gaskets for fuel and water connections to gas engine, requirements on thickness of metal, tolerances on gasket dimensions, water content and loss on ignition test for asbestos, oil test and boiling water test for metal cork gaskets, acceptable types of construction, to conform to F. S. B. spec. ZZ–R–601 for rubber goods.

References.—Testing of rubber goods. *See* 200.

707.12 Paper and Fiber Gaskets

References.—Fiber packing for gaskets. *See* 707.28.

707.13 Rubber Gaskets

American Railway Assn. Mechanical Div. Air Brake Hose Coupling Gasket; 1926. Dimensions and tolerances of standard gasket.

American Railway Assn. Mechanical Division. Gaskets for Air Brake Hose; 1930. Gaskets of rubber compound, deflection and tension test requirements, dimensioned drawing.

U. S. Gov., Federal Specifications Board 43; 1922. Air Brake and Signal Hose and Gaskets. For gaskets for air brake hose and for signal hose, requirements on dimensions, design, deflection test, and tension test.

U. S. Gov., Federal Specifications Board HH–P–156; 1931. Rubber Packings and Gaskets. (Molded, Sheet, and Strip.) Grade A for gaskets and packing of doors, hatches, and gun ports, grade B for gauge glasses and base plugs of projectiles, grade C for cold water and hot water, requirements on tolerances on width and thickness, content of rubber, tensile strength, elongation, set, aging and steaming tests, weight, methods of test as specified in F. S. B. Spec. 59.

References.—Methods of testing rubber products. *See also* 200.

707.14 Cork Gaskets

References.—Metal encased cork gaskets. *See* 707.11. Corkboard and compressed cork. *See* 425.2.

707.2 PACKING

707.21 Asbestos Packing

U. S. Gov., Federal Specifications Board HH–P–31; 1931. Asbestos Metallic Cloth Sheet Packing. Covers 2 grades for steam pressures up to 300 pounds, made of woven asbestos wire insertion cloth treated with rubber, requirements on number of plies, bend test, size of brass or copper wire, content of asbestos, weave, weight, amount of rubber, steam pressure test, methods of test as specified in F. S. B. Spec. 59.

U. S. Gov., Federal Specifications Board HH–P–41; 1931. Asbestos Wick and Rope Packings. Requirements on percentage of asbestos, water of composition in asbestos, freedom from wire insertions, sizing, and lubrication, minimum unit weights, for ¼-inch wicking and ⅜ to 1¼ inch rope packing.

U. S. Gov., Federal Specifications Board. HH–P–36; 1930. Asbestos High Pressure Rod Packing. For asbestos cloth packing treated with rubber compound, requirements on construction, thread count, content of asbestos fiber and of water in yarn, content of rubber and of sulphur in rubber compound, area of core or spring back, amount of lubricant, steam test, tests according to methods of F. S. B. Spec. 59 for rubber goods.

U. S. Gov., Federal Specifications Board. HH–P–46; 1930. Compressed Sheet Asbestos Packing. For steam up to 300 pounds, hot or cold water, brine, air, gases of combustion, and fuel oil, for 1 grade of asbestos fiber and rubber mixed, requirements on content of asbestos, tensile strength, tolerance on thickness, methods of test as specified in F. S. B. Spec. ZZ–R–601 for rubber goods.

U. S. Gov., Federal Specifications Board HH–P–51; 1930. Asbestos Valve Stem Packing. For steam and water pressures up to 300 pounds, also for use with air and fuel oil, for 4 types covering braided asbestos and twisted asbestos types each of which comes in lubricated with oil type and frictioned with rubber type, requirements on construction, percentages of fiber and water in asbestos, amount of lubricant or rubber, testing according to methods of F. S. B. 59 for rubber goods.

U. S. Gov., Federal Specifications Board. HH–P–131; 1930. Plastic Packing, Metallic and Nonmetallic. A packing for rods and valve stems for steam and water pressures up to 300 pounds, also for brine, air, gas, and fuel oil. For the nonmetallic packing, requirements on percentages of asbestos fiber, graphite, and binder in packing, percentage of water in asbestos, type of binder, to conform to F. S. B. Spec. ZZ–R–601 for rubber goods.

References.—Semimetallic packing (asbestos). *See* 707.23. Asbestos cloth and yarn, methods of testing. *See also* 545.4. Methods of testing rubber goods. *See* 200.

707.22 Flax Packing

U. S. Gov., Federal Specifications Board HH–P–106; 1931. Flax Packing. For flax fiber impregnated with tallow, requirements on general quality of materials, length and strength of staple, content of tallow, weight per yard of packing, percentage of oleic acid, saponification number of tallow, methods of sampling and test.

707.23 Metallic Packing

American Marine Standards Committee. E No. 20–1928. Metallic Packing for Condenser Tubes. Specification of material, dimensions and weight of metallic rings, and of material and size of accompanying fiber ring, with pressure and temperature requirements. Appendix gives features of condenser design and instructions for installation of metallic packing.

U. S. Gov., Federal Specifications Board 105; 1923. Metallic Packing, Fixed Ring Type. For reciprocating rods at 300 pounds steam pressure and for gas pressures, wearing surface entirely metal, requirements on construction and high temperature test for resistance to melting and oxidation.

U. S. Gov., Federal Specifications Board 108; 1923. Solid Metallic Packing (Floating Ring Type). Suitable for reciprocating rods for steam pressures up to 300 pounds, and suitable for gas and liquid pressures, requirements on construction, and heat test for resistance to melting or oxidizing.

U. S. Gov., Federal Specifications Board HH–P–126; 1930. Flexible Metallic Packing. Suitable for rotary rod service and for slip joints, for steam and water up to 300 pounds pressure and also for brine, air, gas, and fuel oil. Covers metal foil on jute, twine, rubber, asbestos, or plastic metallic core, metal foil twisted in form of square rope, twisted or braided metal strands, and plastic metallic material inside of braided metal jacket, requirements on quality of metal, number of strands in jute core, composition of plastic metal cores, size of wire in jacket, permissible lubricant, coil test, and heating test, to conform to F. S. B. Spec. ZZ–R–601 for rubber goods.

U. S. Gov., Federal Specifications Board HH–P–131; 1930. Plastic Packing, Metallic and Nonmetallic. A packing for rods and valve stems for steam and water pressures up to 300 pounds, also for brine, air, gas, and fuel oil. For the metallic packing requirements on percentages of metal particles, asbestos fiber, graphite, and binder in packing, percentage of water in asbestos fiber, type of binder, to conform to F. S. B. Spec. ZZ–R–601 for rubber goods.

U. S. Gov., Federal Specifications Board HH–P–166; 1930. Semimetallic Packing. Piston rod packing constructed of frictioned asbestos cloth fastened to metallic member, for steam pressures of 300 pounds and air pressures of 3,000 pounds, not recommended for rotary or liquid service, requirements on weave of asbestos, content of fiber and of water, percentage of metal in packing, coiling and heat resistance test, other tests conforming to F. S. B. Spec. 59 for rubber goods.

References.—Asbestos metallic cloth sheet packing. *See* 707.21. Methods of testing rubber goods. *See* 200.

707.24 Rubber Packing

U. S. Gov., Federal Specifications Board. HH–P–61; 1931. Diaphragm Packing. Requirements on construction, width, and weight of rolls, thickness of rubber layers and of packing, weight and weave of reinforcing cotton duck, chemical composition of rubber compound, tensile strength, elongation, set, adhesion of layers, and breaking strength of fabric, methods of test specified in F. S. B. Spec. 59 for rubber goods.

U. S. Gov., Federal Specifications Board. HH–P–171; 1931. Low Pressure Spiral Gland Packing. Made of slab stock built up of frictioned duck, requirements on construction, weight, thickness of rubber cover, content of new rubber, acetone extract, and sulphur in rubber cover, amount of lubricant, bending and adhesion of parts tests using methods of test of F. S. B. Spec. 59 for rubber goods.

U. S. Gov., Federal Specifications Board. HH–P–151; 1931. Cloth Insertion Rubber Packing. Covers one grade for flanges of ventilation systems and for cold water, and one grade for cold water where separation is frequent, requirements on general quality, weave and weight of fabric, tolerance on thickness, content of new rubber, permissible acetone extract and sulphur, tensile strength, elongation, and set of rubber, adhesion test of rubber and fabric, weights, test methods as specified in F. S. B. Spec. 59 for rubber goods.

U. S. Gov., Federal Specifications Board. HH–P–156; 1931. Rubber Packings and Gaskets (Molded, Sheet and Strip). Grade A for gaskets and packing of doors, hatches, and gun ports, grade B for gauge glasses and base plugs of projectiles, grade C for cold water and hot water, requirements on tolerances on width and thickness, content of rubber, tensile strength, elongation, set, aging and steaming tests, weight, methods of test as specified in F. S. B. Spec. 59.

U. S. Gov., Federal Specifications Board HH–P–181; 1931. Tuck's Packing. For square Tuck's packing of frictioned canvas layers and for round or square Tuck's made with a rubber core, requirements on texture of plies and number per inch, boiling test, flexibility, and adhesion of plies, and cored for the type, requirements on size of rubber in core, tensile test, test methods specified in F. S. B. Spec. 59.

References.—Testing of rubber goods. *See* 200. Methods of testing textile fabrics. *See* 300.4.

707.25 Cotton and Canvas Packing

U. S. Gov., Federal Specifications Board. 99; 1923. Fabric Condenser Tube Packing. Commercially known as cotton corset lacing, requirements on weave, approximate diameter and weight.

U. S. Gov., Federal Specifications Board HH–P–181; 1931. Tuck's Packing. For square Tuck's packing of frictioned canvas layers and for round or square Tuck's made with a rubber core, requirements on texture of plies and number per inch, boiling test, flexibility, and adhesion of plies, and for the cored type, requirements on size, rubber in core, tensile test, test methods specified in F. S. B. Spec. 59.

References.—Methods of testing rubber goods. *See* 200. Methods of testing textile fabrics. *See* 300.4.

707.26 Leather Packing

U. S. Gov., Federal Specifications Board 496; 1927. Hydraulic Packing Leather. For 3 grades of butt bends or sides, vegetable tanned, requirements on trim, permissible defects, finish, thickness, cracking, tensile strength and stretch, water absorption, chemical composition, methods of test.

References.—Methods of analysis. *See also* 060.

707.27 Jute Packing

707.28 Fiber Packing

U. S. Gov., Federal Specifications Board HH–P–91; 1931. Hard Fiber Sheet Packing. For gray fiber made by treating cotton cellulose paper with zinc chloride, requirements on general quality, specific gravity, tensile strength, tolerance on thickness, permissible water absorption. Used for gaskets in water, oil, and air connections for gas engines, and for carbon dioxide gas.

U. S. Gov., Federal Specifications Board HH–P–96; 1930. Fiber Packing for Lubricating and Fuel Oil. Covers impregnated paper sheet packing for oil and gasoline pipe joints, requirements on construction, general qualities, resistance to water, percentage of moisture, tensile strength, bend test, and weight, methods of test as specified in F. S. B. Spec. 59 for rubber goods.

References.—Methods of testing rubber goods. *See* 200. Methods of testing fiber board. *See also* 470.3. Other fiber board. *See* 472.93.

707.3 RUBBER VALVES FOR PUMPS

American Society for Testing Materials Tentative Specifications. D 151–31T; 1931. Rubber Pump Valves. For pumps equipped with grid type seats, for hard, medium, and soft grades for use with various water temperatures and pressures, requirements on content of rubber, hardness, dry heat test, steam test, tolerances on dimensions, chemical analysis in accordance with A. S. T. M. method D 297–29T.

U. S. Gov., Federal Specifications Board 114a; 1925. Rubber Valves. Covers hard, medium, and soft valves for pumps equipped with grid-type seats. Requirements for tolerances in dimensions, dry heat and steam heat tests, percentage of rubber, acetone extract, sulphur content, hardness, method of measuring hardness.

References.—Methods of testing rubber goods. *See also* 200.

707.4 PIPE COVERINGS AND BOILER LAGGING

707.40 General Items

American Marine Standards Committee. E No. 19–1928. Cotton Duck for Insulation Coverings. Requirements on length, weave, thread count, ply, width, weight, strength, and methods of testing and sampling.

American Railway Assn. Purchases and Stores Div. Standardization and Simplification of Stores Stocks; 1926. Boiler Lagging, Flat and Curved. Dimensions of 5 standard sizes.

References.—Heat transmission tests. *See* 792.0.

707.41 Cork Pipe Coverings

American Marine Standards Committee. E. No. 14–1928. Insulation of Piping and Machinery on Ships. Includes requirements for cork insulation, types of insulation projects to which applicable, construction, thickness and application of cork coverings to pipes and fittings.

U. S. Gov., Federal Specifications Board LLL–C–571; 1931. Compressed Cork (Corkboard). Corkboard intended for insulation, requirements on behavior and expansion in boiling test, weight of material, dimensions of blocks.

U. S. Gov., Federal Specifications Board HH–C–571; 1931. Granulated Cork for Insulating Purposes. Requirements on baking, screen grading, and weight.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures. (For Land Use). Pipe Covering. Sectional molded cork covering 1¼ inches thick, requirements for manufacture, type of jacket, application of covering to pipes and valves, for drinking or ice water supplies where specified.

References.—Duck for insulation coverings. *See* 707.40.

707.42 Asbestos Coverings, for Pipes and Boilers

American Marine Standards Committee. E No. 31–1930. Molded Insulation Coverings for Temperatures Over 550° F. Requirements number and thickness of layers of high temperature covering and of magnesia coverings for various sizes of pipe, requirements on abrasion resistance of high temperature insulation and test requirements on hardness, heat insulating value, loss of weight and shrinkage, permissible weight.

American Marine Standards Committee. E No. 14–14–1928. Insulation of Piping and Machinery on Ships. Includes requirements for asbestos insulation, types of insulating projects to which applicable, weave and weight requirements for asbestos cloth, reference to A. M. S. C. specifications for asbestos mill board, requirements on thickness, construction, and application of asbestos insulation to pipes and machinery.

Asbestos Bureau, (Inc.) Standard Asbestos Bureau Code; 1931. Aircell Insulation. For insulation made of corrugated asbestos paper, requirements on thickness of ply or corrugation, structural features, standard number of plies and thickness of insulation.

Asbestos Bureau, (Inc.) Standard Asbestos Bureau Code; 1931. Hi-Temperature Insulation. For temperatures up to 1600° F., requirements on composition, weight, continuous temperature test, and compressive strength under heat.

References.—Standard sizes of boiler lagging. *See* 707.40. Asbestos paper, millboard, and textile. *See also* 545.4. Duck for insulation covering. *See* 707.40.

707.43 Magnesia Coverings for Pipes and Boilers

American Marine Standards Committee. E No. 15–1928. Magnesia Molded Pipe Covering and Blocks. Specification of material, weight and thickness for 85 per cent magnesia, methods of test for hygroscopic moisture, chemical analysis, and loss on ignition. Substantially identical with that issued by the Federal Specifications Board.

American Marine Standards Committee. E No. 14–1928. Insulation of Piping and Machinery on Ships. Includes requirements for magnesia insulation, types of insulation projects to which applicable, reference to A. M. S. C. specifications for magnesia for insulation, requirements on thickness, construction and application of magnesia insulation to piping and machinery.

American Marine Standards Committee. E No. 16–1928. Magnesia Asbestos Plaster. Specifications for material for 85 per cent magnesia plaster, test methods for moisture, chemical analysis, loss on ignition. Substantially identical with F. S. B. specification.

Asbestos Bureau, (Inc.) Standard Asbestos Bureau Code; 1931. 85 per cent Magnesia. Requirements on content of magnesium carbonate and of asbestos fiber, soaking heat test, conductivity, density, transverse strength, compressive strength, weight of canvas jacket, standard thicknesses of pipe covering.

U. S. Gov., Federal Specifications Board HH–M–51; 1931. Magnesia Asbestos Plaster. For 85 per cent magnesia material, requirement on composition, molding and heating test, weight, methods of analysis. Used for insulating pipes and other surfaces against heat.

U. S. Gov., Federal Specifications Board HH–M–71; 1931. Magnesia Molded Pipe Covering and Blocks. For 85 per cent magnesia material for pipe covering and lagging, requirements on composition, weight, standard thicknesses of pipe covering, weight of canvas cover, size and material of attachment bands, sizes of rectangular blocks, methods of analysis.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Heater and Tank Covering. 85 per cent magnesia covering, block or plastic, minimum thickness, finish, and method of application requirements.

References.—Standard sizes of boiler lagging. *See* 707.40. Duck for insulation covering. *See* 707.40.

707.44 Felt Pipe Coverings

American Marine Standards Committee. E. No. 14–1928. Insulation of Piping and Machinery on Ships. Includes requirements for hair and wool felt insulation, types of insulation projects to which applicable, reference to A. M. S. C. specifications for felt insulating material, requirements on thickness, construction, and application of felt insulation to pipes and machinery.

American Marine Standards Committee. E No. 18–1928. Hair Felt for Insulation. Specification for material, weight and size of hair felt. Substantially identical with Federal Spec. Board specification for the same material.

Asbestos Bureau, (Inc.) Standard Asbestos Bureau Code; 1931. Solid Wool Felt Insulation. Requirements on general construction, tolerance on thickness, and type of linings for cold water and for hot water pipes.

U. S. Gov., Federal Specifications Board 158; 1924. Hair Felt. For cattle hair felt suitable for pipe covering and general low temperature insulating purposes, requirements on general quality, width, weight and area per roll for thicknesses up to 2 inches.

U. S. Gov., Federal Specifications Board 448; 1926. Plumbing Fixtures (For Land Use). Pipe Covering. Where required. Minimum thickness of wool felt sectional covering, lining and jacket materials, dimensions, finish, and application of bands, types of plastic materials and their applications to valves and fittings, for hot and cold water supplies.

References.—Other specifications and methods of testing for felt. *See* 365.98. Duck for insulation coverings. *See* 707.40.

707.45 Fire Clay Insulation for Boiler Furnaces

American Marine Standards Committee. E. No. 14–1928. Insulation of Piping and Machinery on Ships. Includes requirements for fire clay insulation, types of insulation projects to which applicable, reference to A. M. S. C. specifications for fire clay insulation material, requirements on thickness, construction, and application of fire clay insulation to furnaces.

References.—Fire clay refractories. *See also* 534.12.

708. HEATING EQUIPMENT FOR POWER PLANTS

References.—Heating equipment. *See* 792.1.

710–719 ELECTRICAL MACHINERY AND SUPPLIES

710. GENERAL ITEMS

American Institute of Electrical Engineers. Standard No. 1; 1925. General Principles Upon Which the Temperature Limits are Based in the Rating of Electrical Machinery and Apparatus. Classification of insulating materials, methods of temperature determination, limiting observable temperatures and temperature rises. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Report on Standard No. 2; 1927. Standard Definitions. Definitions of electrical terms taken from the approved standards of the A. I. E. E. A committee report making recommendations to the A. I. E. E.

American Institute of Electrical Engineers. Standard No. 4; 1928. Measurement of Test Voltage in Dielectric Tests. Measurement with voltmeter, needle spark gap and sphere spark gap, tables of sparkover voltages, specification of testing equipment.

American Institute of Electrical Engineers. Standard No. 17gl; 1928. Letter Symbols for Electrical Quantities. Approved by American Standards Assn. as Z10gl–1929.

American Institute of Electrical Engineers. Report on Standards for Graphical Symbols Used for Electric Power and Wiring. (17g2); 1930. A committee report covering recommended standard symbols for use in wiring diagrams, etc., for power apparatus, instruments and relays, and for maps and connection diagrams.

American Institute of Electrical Engineers. Standard No. 42; 1923. Joint sponsors with American Institute of Architects, Assn. of Electragists-International, under American Standards Assn. procedure, C 10–1924. Standard Symbols for Electrical Equipment of Buildings. Symbols for drafting purposes.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Nature of Supply. Lists recognized standard systems of distribution as 2 wire, 3 wire, and 3 phase 3 wire, standard voltages for motors, lighting, and generators for direct current and for alternating current, standard frequency.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Standard Symbols. Standard drafting symbols are illustrated and defined for marine lighting, heating, power and interior communication systems.

American Mining Congress, U. S. Bureau of Mines, sponsors under auspices of American Standards Assn. M 2–1926. Safety Rules for Installing and Using Electrical Equipment In Coal Mines. Definitions, limitations on voltage and capacity, use of insulated platforms, grounding of frames and sheaths, guarding of circuits, installation and protection of motors and controllers, safety devices for electric hoists, construction of underground stations and switchboards, installation of lamps, requirements for portable electrical equipment, installation and protection of circuits, trolley wires, signal and telephone circuits, and shotfiring circuits.

American Society of Mechanical Engineers. Power Test Codes. Instruments and Apparatus, pt. 13; 1930. Speed Measurements. Descriptions, principles of operation, relative advantages, installation rules, range and accuracy, precautions in taking readings, for continuous counters and hand counters with watch, tachoscopes, speed indicators, centrifugal tachometers and electric tachometers, stroboscopes.

American Society for Testing Materials. A 34–28; 1928. Methods of Test for Magnetic Properties of Iron and Steel. For induction and hysteresis measurement, definitions, requirements for test specimens, 4 methods of test listed but not described, limitations of each method; for core loss measurement, definitions, procedure, requirements of testing apparatus, and sampling; for measurement of properties at low inductions and audiofrequencies, requirements for test specimen, apparatus, and procedure, calculation of induction and permeability.

American Society for Testing Materials. Tentative Definitions. A127–31T; 1931. Definitions of Terms, With Units and Symbols, Relating to Magnetic Testing.

Assn. of Railway Electrical Engineers 1929 Manual. Section C; 1928. Electrical Construction. Installation and Maintenance of Electrical Equipment. Safety practices in construction of buildings, power plant, switchboards, motor and control equipment, wiring, grounding practice and resistance of grounds, storage battery rooms, installation and maintenance of batteries, resuscitation methods.

National Electric Light Assn. Proceedings, vol. 83, p. 622; 1926. Symbols for One Line Wiring Diagrams. Suggested standard drafting symbols for one line diagrams for a. c. rotating apparatus, d. c. rotating apparatus, power, potential, and current transformers, induction regulators, oil and air circuit breakers, disconnecting and horn gap switches, resistors, instruments, etc.

National Electrical Mfrs. Assn. and National Electric Light Assn. Preferred Voltage Ratings for A. C. Systems and Equipment; 1930. Tables of preferred voltage ratings for alternating current generators, motors, general apparatus, distribution transformers, substation and general purpose transformers, generating station transformers, interconnection transformers for reversible tie purposes.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 112–315. Approved by American Standards Assn. as C 6–1925. Connections and Marking of Terminals for Electric Power Apparatus. Significance of terminal letter and subscript numeral, terminal letters assigned to different types of windings and their functions, illustration of use of markings on connection diagrams.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 120.4–15 and 112.4–25. Abbreviations. Standard abbreviations for power apparatus, switchboard, control, and switching equipment, descriptions.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 120.6–15. Graphic Symbols. Standard symbols recommended for electrical apparatus on wiring diagrams.

National Electrical Mfrs. Assn. Publ. 31–10; 1931. Switchgear Standards. Definitions and Symbols. Standard definitions, including many of those of Am. Inst. of Elec. Engrs., covering properties and characteristics of apparatus, service classification, rating, relays, switches, power switchboards, metal clad and automatic switchgear, oil and air circuit breakers, high voltage fuses, standard graphic symbols.

Society of Automotive Engineers 1931 Handbook. Insulation Test of Electrical Apparatus; 1926. High voltage test requirements for gasoline automobile electrical apparatus on circuits of 6 to 40 volts, except batteries.

U. S. Gov., Dept. of Commerce. Bureau of Standards C17; 1926. Magnetic Testing. Methods of measurement for magnetic testing used by the bureau, including several methods for normal induction and hysteresis, the Lloyd method for core loss, and the method for susceptibility, descriptions of apparatus, properties necessary in magnetic standard test specimens for standardizing permeameters.

U. S. Gov., Dept. of Commerce, Bureau of Standards C56; 1923. Standards for Electric Service. Proposed rules for State public utility commissions regulating electric service companies, including rules on operation and maintenance, pole identification and inspection, grounding of circuits, location of meters, meter testing facilities, accuracy and periodic testing of meters, voltage and frequency standards, accident records, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards H4; 1928. Discussion of the National Electrical Safety Code. A 334-page handbook discussing the rules of the fourth edition of the code and the method of their application.

U. S. Gov., Dept. of Commerce, Bureau of Standards H6; 1926. Approved by American Standards Assn. as part of C 2–1927. Safety Rules for the Installation and Maintenance of Electrical Supply Stations. Rules covering methods of protective grounding of circuits, equipment, and lightning arresters for stations, protective arrangements of stations and substations, protective arrangements of equipment, guarding shaft ends, pulleys, and belts, provision of working space about equipment, shielding of equipment, identification, hazardous locations, guarding live parts, for various types of station equipment.

U. S. Gov., Dept. of Commerce, Bureau of Standards H7; 1926. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the Installation and Maintenance of Electric Utilization Equipment. For 25 to 750 volt equipment which is accessible to other than qualified electrical operators, rules on installation, grounding, protection, provision of guards, etc., for conductors, fuses, circuit breakers, switches, controllers, switchboards, motors, electric furnaces, fixtures and signs, portable devices, electric locomotives and cranes, telephone apparatus exposed to supply lines, etc.

References.—Protection of electrical circuits and equipment against lightning. *See* 715.50, 715.51. Ground clamps. *See* 719.72. Tolerances for metal fits. *See also* 615.82.

711. ELECTRIC GENERATORS AND MOTORS

711.1 ELECTRIC GENERATORS

711.10 General Items

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn. as C1–1931. Generators. Requirements on protection of terminals and live parts, location of generator, permissible types and arrangement of excessive current protective devices, grounding requirements.

711.11 Alternating Current Generators

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Generators. Requirements on tension and bend test for steel forgings for shafts of propulsion generators, voltage ratings of auxiliary generators, permissible temperature rises on full load, insulation resistance and dielectric strength test requirements.

American Institute of Electrical Engineers. Standtors and Synchronous Machines in General. Does not include synchronous converters of alternating to direct current. Definitions, classifications as ard No. 7; 1927. Alternators, Synchronous Moto enclosure, protection, and duty, rating, heating limits, temperature determination, overload, short-circuit, and overspeed requirements, calculation of natural frequency, measuring efficiency, dielectric test, insulation resistance, voltage regulation, allowable deviation factor, allowable variation in voltage and frequency of motors. No limits given for efficiency and regulation. 1925 edition available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Alternating Current Generators for turbine electric drive. Recommendations on structural and operating features of forced ventilation, fire extinguisher equipment, heaters for preventing of condensation, maximum voltage, provision of temperature detectors, short circuit protection, prevention of circulating currents through journals, installation, lubrication, temperature rise and test for 50° C. ambient and dielectric test in accordance with A. I. E. E. standards.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Generating Sets, Alternating Current. For other than propulsion generators, recommendations on standard phase, voltage, and frequency, rating at 80 per cent power factor, temperature rise and insulation requirements in accordance with A. I. E. E. standard No. 7, capacity of exciter.

American Railway Assn. Signal Section. 7319; 1920. Alternator. General structural requirements, permissible variation of wave form from sine shape, overload and short-circuit capacity, test requirements for polarity, resistance of windings, dielectric strength, insulation resistance, saturation, and temperature rise according to rules of Am. Inst. of Elec. Engrs.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG14–55.

Generators, Alternating Current (Exclusive of turbo-generators, single phase alternators, inductor alternators, or induction generators). Standard basis of rating, frequency ratings, recommended voltage ratings and permissible temperature rise, standard output and speed ratings for alternators and recommended ratings for engine type generators, requirements on standard excitation voltage, overload capacity, dielectric test, operation at 0.8 power factor, overspeed capacity, terminal markings, recommended bores for rotors.

References.—Protection requirements. *See also* 711.10. Definitions, symbols, voltage and frequency standards, methods of test, safety codes. *See also* 710. Cast iron, forged steel, shafts. *See also* 611.11, 611.51, 611.52. Plain bearings, ball and roller bearings. *See also* 692.3, 766.2. Copper wire. *See* 715.44.

711.12 Direct Current Generators

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Generators. Requirements on tension and bend test for steel forgings for shafts of propulsion generators, voltage ratings of auxiliary generators, permissible temperature rises on full load, insulation resistance and dielectric strength test requirements.

American Institute of Electrical Engineers. Standard No. 5; 1925. Direct Current Rotating Machines, Generators and Motors. Does not include fractional horse power, synchronous, or railway motors. Definitions, classification as to speed, inclosure, protection, ventilation, and duty; rating, heating limits, temperature tests, commutation, overspeed limits, efficiency, dielectric and insulation resistance tests, regulation tests, direction of rotation. No limits specified for efficiency and regulation. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Generating Sets, Auxiliary. For direct current generating sets, recommendations on number and size of generating sets, standard voltages, voltage regulation and compounding, lubrication when tilted, parallel operation, limits of temperature rise and voltage insulation test, spare parts, installation.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Exciters. Generators for excitation of propulsion equipment, recommendations on type of drive, on maximum rated voltage, method of varying voltage, temperature rise and dielectric test in accordance with A. I. E. E. standards for 50° C. ambient.

American Railway Assn. Mechanical Div. Recommended Practice. Axle Generator Equipment; 1930. Recommended capacities and sizes of axle generators for various classes of railway service, maximum speed, general structural features and insulation, chemical composition and physical properties of carbon steel for shaft, air gap clearance, heating test, high speed test, dielectric test, operating requirements for automatic generator regulating apparatus, test requirements for lamp regulator.

American Railway Assn. Mechanical Div. Recommended Practice. Locomotive Lighting; 1927. For turbo-generator, requirements on system voltage, minimum capacity of generator, steam pressure rating of turbine, capacity of speed regulator, location and method of attachment to locomotive, sizes of steam pipes, ball bearings, and brushes, setting of brush holders.

American Railway Assn. Signal Section 1411; 1911. Electric Generator. Shunt wound, self-excited generator with self-oiling bearings, maximum rated speed, continuous and overload capacity requirements and allowable temperature rise for the connected storage battery load.

Assn. of Railway Electrical Engineers 1929 Manual. Electric Train Lighting; 1928. Includes axle generator specifications, recommended sizes and capacities of 40 volt generators for various railway cars, requirements for frame, field coils, armature, bearings, air gap, leads, composition and strength of armature shaft, test requirements for rating verification at 65° C. rise, high speed, high voltage.

Assn. of Railway Electrical Engineers 1929 Manual. B–I; 1928. Turbo-Generator. 32 volt lighting turbo-generator of about 500 watts, mounting details, sizes of steam connections, ball bearings, brushes, and brush holders, lubrication requirements.

Automotive Electric Assn. Generators; 1925. Classification of generators into 5 classes, for 6-volt automotive service, requirements on speed, current, and voltage characteristics, permissible temperature rise for given conditions in each class.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG14–10. Generators, Direct Current. Basis of rating of 2-wire and 3-wire generators, standard and recommended voltage ratings, permissible temperature rise at rated load, recommended practice on degree of compounding and bore diameters, requirements on overload test, commutation, voltage regulation of 3-wire generators, dielectric test, direction of rotation.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG16–10. Prepared in cooperation with Soc. of Automotive Engrs. Isolated Electric Farm Lighting Plants. Recommended practice on voltages and number of cells of storage batteries, on output, voltage, and speed ratings of generator, on permissible temperature rise at rated load, on commutation, and on dielectric test.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Voltage and Capacity Ratings for Isolated Electric Lighting Plants; 1928. Nominal generator voltage, service voltage, and speed for standard outputs, standard number of alkaline or lead type battery cells.

Underwriters' Laboratories. Electric Lighting Plants; 1921. Includes for generators, type of inclosure, insulation of lead wires, temperature rise and dielectric strength test requirements.

References.—Generators for arc welding. *See* 767. Protection requirements. *See also* 711.10. Synchronous converters. *See* 713.2. Definitions, symbols, voltage standards, methods of test, safety codes. *See also* 710. Automobile generator mountings. *See* 722.32. Cast iron, forged steel, shafts. *See also* 611.11, 611.51, 611.52. Plain bearings, ball and roller bearings. *See also* 692.3, 766.2. Copper wire. *See* 715.44. Airplane generator mountings. *See* 724.21.

711.2 ELECTRIC MOTORS

711.20 General Items

Assn. of Iron and Steel Electrical Engineers. Report of Special Bearing Committee on Application of Roller Bearings to Mill Type Motors; 1929. Includes data sheets showing the bearing sizes applicable to various size motors, for bearings of various make and motors of various manufacture.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn. as C1–1931. Motors. Protection of terminals and live parts, requirements on type, location and rating of disconnecting means, general requirements on acceptable types of controllers.

National Electric Light Assn. Proceedings, vol. 80, p. 519; 1923. 1923 Revision of Motor Rules. Suggested rules on installation and use of motors, including provision of no-voltage protection, reverse phase relays, allowable starting current and allowable running current values for various sizes of motors.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG4–10. Manufacturing Practice. Standard classification of insulating materials, basis of rating of general purpose motors, standard location of terminals, standard lettering of dimension sheets, direction of rotation, recommended standard taper for tapered shafts.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG50–10. Definitions. Definitions of terms, classification of motors by power, type of inclosure, system of cooling, features of design, duty and service, speed, definitions of rating, of performance and test, of complete machines and parts.

National Machine Tool Builders Assn. T–1; 1927. Driving Speeds. Five recommended standard speeds for machine tool drives, two recommended standard speeds for constant speed motors for machine tool drive, recommended standard sizes of machine pulleys resulting in 9 standard ratios between motor and machine speeds.

711.21 Alternating-Current Motors

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Motors. Requirements on tension and bend test for steel forgings for shafts of propulsion motors, lubrication and operation at 15° inclination for auxiliary motors, permissible temperature rises on full load, insulation resistance and dielectric strength test requirements.

American Institute of Electrical Engineers. Standard No. 7; 1927. Alternators, Synchronous Motors and Synchronous Machines in General. Does not include synchronous converters of alternating to direct current. Definitions, classification as to inclosure, protection, and duty, rating, heating limits, temperature determination, overload, short-circuit, and overspeed requirements, calculation of natural frequency, measuring efficiency, dielectric test, insulation resistance, voltage regulation, allowable deviation factor, allowable variation in voltage and frequency of motors. No limits stated for efficiency or regulation. 1925 edition available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 9; 1927. Induction Motors and Induction Machines in General. Definitions, classification as to speed, inclosure, protection, ventilation and duty, heating limitations, temperature tests, overspeed and torque limits, efficiency measurements, tests of dielectric strength and insulation resistance, direction of rotation, allowable variation in voltage and frequency. No limits stated for efficiency. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 10; 1925. Direct and Alternating Current Fractional Horsepower Motors. Definitions, classification as to speed, inclosure, protection, ventilation, and duty, rating, heating limitations, commutation, overspeed and torque limits, efficiency measurement, dielectric test, regulation, and rotation. No limits stated for efficiency or regulation. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Motors, Alternating Current. For other than propulsion motors, recommendations on standard voltages, lubrication in tilted positions, provision of noncorrodible small parts, limits of temperature rise and insulation voltage tests, type of motor as regards winding, inclosure, speed variation, and time rating applicable to steering gear, deck machinery, engine room motors, blowers, and pumps. For brakes, recommendations on construction and inclosure, limits of temperature rise, short circuit and high potential tests, torque rating, application of various types.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Alternating Current Motors for turbine electric ship drive. Recommendations on type and operating features of ventilating equipment, fire extinguishing means, heater, temperature detectors, slide rails for moving stater, temperature rise test for 50° C ambient and dielectric test in accordance with A. I. E. E. standards, installation, lubrication.

American Petroleum Institute. Standard No. 11–F; 1930. Electric Induction Motor Performance Data. List of guaranteed performance data and of performance test data on the individual motor and controller to be furnished by the manufacturer, to be in accordance with standards of Am. Inst. of Elec. Engineers and Nat. Elec. Mfrs. Assn., horsepower rating based on 40 degrees temperature rise, for single power rated and double motor rated motors.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Includes induction motors, slip ring and high resistance rotor squirrel cage types, stalling torque and maximum rated speed requirements, permissible temperature rise for operation at rated load for specified times, heat and high potential tests in accordance with standardization rules of American Institute of Electrical Engineers.

American Society of Refrigerating Engineers. Circular No. 5; 1926. Specifications for Synchronous Motors. Covers motors designed for direct connection to ammonia compressor. Specification of flywheel effect, and itemized form for tabulating the dimensions and operating data of the compressor which the motor must be designed to meet.

Associated Factory Mutual Fire Insurance Companies. Centrifugal Fire Pumps; 1931. For alternating current motors for driving pump, requirements on starting and permissible starting current, temperature rise and overload test, impregnation of windings, types of bearings, design of inclosures for inclosed types.

Assn. of Iron and Steel Electrical Engineers. A. C. Motors for Main Roll Drive. Undated. For induction motor, tests in accordance with rules of Am. Inst. of Elec. Engrs., rating based on 50° C. rise, general structural requirements for stator, rotor, bearings, bearing supports, rating of resistors, operating requirements for primary and secondary control, construction, operating and temperature limit requirements for liquid slip regulators, detail specifications to be furnished by bidder.

Assn. of Railway Electrical Engineers. Short Time Duty Motors Such as for Turntables, Bending Rolls, Cranes, etc.; 1923. Permissible temperature rises for various time duties, general requirements for commutation, bearings, shaft, for a. c. and d. c. motors.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG8–10. Small Power Motors, Universal. Under 1 hp., definitions of plain series and compensated series types, standard voltage and frequency ratings, standard dimensions of 7 stator sizes, dielectric test requirements, operation at variations from rated voltage and frequency, standard shaft extension dimensions.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG8–80. Small Power Motors, Alternating Current. Under 1 hp., classification, standard voltage and frequency ratings, permissible temperature rise, recommended practice on load and speed ratings, on torque characteristics, on dimensions of pulleys, belts, and shaft extensions, requirements on dielectric test, minimum efficiency and power factor, operation on variations from rated voltage and frequency, taper of shafts, direction of rotation, etc.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG9–310. Large Power Motors, Single Phase. For 1 hp. and larger, 40° to 75° C. rating motors, standard voltage, frequency, load, and speed ratings, permissible temperature rise at rated load, requirements on starting, pull-in, and break down torques, on dielectric test, operation on variations from rated voltage and frequency, recommended practice on pulley and belt dimensions, on shaft extensions, standard direction of rotation, location of terminals, etc.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG9–509. Large Power Motors, Polyphase Induction. For 1 hp. or over, 40° to 75° C. rating motors, standard voltage, frequency, load and speed ratings, permissible temperature rise, requirements on starting, pull-in, and break down torque, dielectric test, operation on variations of voltage and frequency, recommended practice on pulley, belt, and shaft extension dimensions, standard shaft taper, etc.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG10–10. Large Power Motors, Synchronous. For separately excited motors, standard voltage and frequency ratings, recommended load and speed ratings for general purpose and compressor type motors, permissible temperature rise, permissible pulsating armature current with reciprocating machinery, calculation of natural frequency of motor-compressor, requirements on starting, pull-in, and pull-out torques, dielectric test, operation on variations from rated voltage and frequency.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG12–50. Elevator Motors, Alternating Current. For high-speed type, basis of rating, recommended practice on torque, horsepower, and time temperature rating, on operation at variations in voltage and frequency.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG12–110. Crane Motors, Alternating Current. Standard horsepower and speed ratings, permissible temperature rise for wound rotor open type motors up to 40 h.p.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG18–15. Frequency Converters and Motors Above 60 Cycles for Industrial Purposes. For high frequency motors up to 180 cycles, recommended practice on voltage and frequency rating and on permissible temperature rise.

References.—Motors for railway signals. *See* 718.41. Motors for hazardous locations. See 711.25. Railway motors. *See* 711.3. Definitions, symbols, voltage and frequency standards, rating standards, classification, methods of test, protection, safety codes. *See also* 710, 711.20. Electric tools. *See* 711.24. Brushes. *See* 711.42. Synchronous converters. *See* 713.2. Impregnation of windings. *See also* 719.57, 719.59. Cast iron, forged steel, shafts. *See also* 611.11, 611.51, 611.52. Plain bearings, ball and roller bearings. *See also* 692.3, 766.2. Copper wire. *See* 715.44.

711.22 Direct-Current Motors

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Motors. Requirements on tension and bend tests for steel forgings for shafts of propulsion motors, lubrication and operation at 15° inclination for auxiliary motors, permissible temperature rises on full load, insulation resistance and dielectric strength test requirements.

American Institute of Electrical Engineers. Standard No. 5; 1925. Direct-Current Rotating Machines, Generators and Motors. Does not include fractional horse power, synchronous, or railway motors. Definitions, classification as to speed, inclosure, protection, ventilation, and duty; rating, heating limits, temperature tests, commutation, overspeed limits, efficiency (no limits of efficiency set), dielectric and insulation resistance tests, regulation tests (no limits set), direction of rotation. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 10; 1925. Direct and Alternating Current Fractional Horsepower Motors. Definitions, classification as to speed, inclosure, protection, ventilation, and duty, rating, heating limitations, commutation, overspeed and torque limits, efficiency measurement, dielectric test, regulation, and rotation. No limits given for efficiency or regulation. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Direct Current Motors for propulsion. Recommendations on structural and operating features of forced ventilation, overload protection, maximum designed voltage, protection of terminals, means for jacking over rotor, installation, lubrication, temperature rise and test for 50° C. ambient and dielectric test in accordance with A. I. E. E. standards.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Motors, Direct Current. For auxiliary motors, recommendations on standard voltages, lubrication at angles of tilt, provision of noncorrodible parts, limits of temperature rise and insulation voltage tests, spare parts, installation, types of motors as regards type of winding, inclosure, speed variation, and time rating for engine room auxiliaries, steering gears, deck winches, windlasses, capstans, pumps, ventilating fans and blowers, galley and laundry appliances. For brakes and magnetic clutches, recommendations on construction and inclosure, limits of temperature rise and high potential tests, torque rating, types applicable to various motor equipment.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Includes direct current motors, series type, with commutating poles conforming to rules of American Institute of Electrical Engineers, maximum speed rating, permissible temperature rise for operation for 30 minutes at rated output.

Associated Factory Mutual Fire Insurance Companies. Centrifugal Fire Pumps; 1931. For direct-current motors for driving pump, requirements on ratio of no load to full load speed, temperature rise and overload test, impregnation of windings, types of bearings, design of inclosures for inclosed types.

Assn. of Iron and Steel Electrical Engineers. Standardize Commutating Pole Mill Type Motor; 1927. General design of split frame motor with end capsules for mounting sleeve or roller bearings, over-all dimensions, dimensions of mounting holes, of gears, of axle-shaft details for 7 frame sizes of mill and crane motors, 7½ to 75 horsepower, speed, torque, and gear ratios.

Assn. of Railway Electrical Engineers. Short Time Duty Motors Such as for Turntables, Bending Rolls, Cranes, etc.; 1923. Permissible temperature rises for various time duties, general requirements for commutation, bearings, shaft, for a. c. and d. c. motors.

Automotive Electric Assn. Standard Ratings for Starting Motors; 1925. Standard ratings for 4 sizes of motors as used with corresponding standard battery sizes, giving locked torque and horsepower at 400 r. p. m.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG8–10. Small Power Motors, Universal. Under 1 hp., definitions of plain series and compensated series types, standard voltage and frequency ratings, standard dimensions of 7 stator sizes, dielectric test requirements, operation at variations from rated voltage and frequency, standard shaft extension dimensions.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG8–30. Small Power Motors, Direct Current. Under 1 hp., standard voltage ratings, standard windings, recommended load and speed ratings, permissible change in speed with load and heating, dielectric test requirements, operation at variations from rated voltage, permissible variation from rated speed, direction of rotation, permissible temperature rise, recommended practice on dimensions of pulleys, belts, and extension shafts.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG9–10. Large Power Motors, Direct Current. 1 hp. and larger, 40° to 75° C. rating motors, standard voltage ratings, recommended practice on load and speed ratings for constant speed, adjustable speed, and machine tool motors, on speed limitations for belt and for gear drive motors, on time rating for machine tool motors, requirements on dielectric test, permissible change in speed with load and heating, temperature rise, variation from rated speed, recommended dimensions of pulleys, belts, shaft extensions, terminal box, standard shaft taper and direction of rotation.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG9–120. Direct Current Motors for Direct Connection to Centrifugal Fans. Standard horsepower and speed ratings for slow speed adjustable and constant speed ventilating fan motors, permissible temperature rise, dielectric test requirements.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG12–10. Elevator Motors, Direct Current. For geared high-speed type and for gearless type, recommended practice on voltage ratings, on load and speed ratings, temperature rise, on dielectric test, on speed variations with heating and with load, operation at other than rated voltage.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Electric Vehicle Motors; 1923. Motor rating to be based on temperature rise of 65° C. after 4-hour run, two classes of motors dependent on voltage rating for electric vehicles except industrial trucks and tractors.

References.—Motors for railway signals. *See* 718.41. Motors for hazardous locations. *See* 711.25. Railway motors. *See* 711.3. Definitions, symbols, voltage and rating standards, classification, methods of test, protection, safety codes. *See also* 710, 711.20. Brushes. *See* 711.42. Motor driven portable tools. *See* 711.24. Automobile starting motor mountings. *See* 722.32. Airplane starting motor mountings. *See* 724.21. Cast iron, forged steel, shafts. *See also* 611.11, 611.51, 611.52. Impregnation of windings. *See also* 719.57, 719.59. Plain bearings, ball and roller bearings. *See also* 692.3, 766.2. Copper wire. *See* 715.44.

711.23 Motor-Driven Fans and Blowers

U. S. Gov., Federal Specifications Board. 491; 1927. Electric Fans, Desk and Bracket Type. For 10, 12, and 16 inch sizes, 4-blade type, requirements on operating voltages, on operation on variation of voltage, position adjustment, general structural features, test for noise, temperature rise, high voltage, requirements on speed, thrust, and input, permissible ratio of input to thrust, methods of test.

References.—Fractional horsepower motors. *See also* 711.21, 711.22. Methods of testing. *See also* 710, 711.20. Brushes. *See* 711.42. Fans and blowers. *See also* 791.1. D. c. motors for ventilating fans. *See* 711.22.

711.24 Electric Tools

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 118–301. Electric Tools, Buffers and Grinders. For bench group and for floor group, standard d. c. and a. c. voltage ratings, standard frequency ratings, recommended practice on speed ratings for various wheel diameters, on permissible temperature rise at rated load, required overload capacity.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 118.2–10. Electric Tools, Drills and Reamers. Standard voltage ratings for direct current, universal, and polyphase electric tool motors, standard frequency ratings, standard portable drill and reamer size ratings dependent on chuck or socket size, permissible temperature rise, rate of drilling test requirements, operation on variations from rated voltage.

References.—Fractional horsepower motors. *See also* 711.21, 711.22. Brushes. *See* 711.42. Methods of testing. *See also* 710, 711.20. Grinding wheels. *See* 541.3.

711.25 Motors for Hazardous Locations

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG3–20. Fractional Horsepower Motors for Use with Hazardous Liquids or Gases. For 2 grades of which one shall be capable of withstanding an internal pressure of 50 pounds, to conform to N. E. M. A. standard continuous or short time ratings, recommended practice on frame and inclosure construction.

Underwriters' Laboratories (Inc.). Electric Motors for Use in Atmospheres of Combustible Dust; 1930. For totally inclosed and inclosed ventilated types, requirements on width of casing joints and length of path in shaft openings, sealing of leads, tests for effect on dust tightness produced by both continuous and intermittent operation, and tests for blanketing effect of dust.

U. S. Gov., Dept. of Commerce. Bureau of Mines. Schedule 2C; 1930. Explosion Proof Mine Equipment. Motors. Requirements for approval for use in gassy or dusty mines, including provision of explosion proof inclosure, structural features regarding inspection openings and covers, bearings and shaft clearances, lead entrances, inclosure joint construction, etc., explosion tests.

References.—Motors, a. c. and d. c. *See* 711.21, 711.22. Definitions, symbols, voltage and rating standards, classification, methods of test, safety codes. *See also* 710, 711.20. Brushes. *See* 711.42. Cast iron, forged steel, shafts. *See also* 611.11, 611.51, 611.52. Copper wire. *See* 715.44.

711.3 RAILWAY MOTORS

American Institute of Electrical Engineers. Standard No. 11; 1925. Approved by American Standards Assn. as C35–1928. Railway Motors. Direct and alternating current motors, definitions, rating, heating limits and measurement, measurement of efficiency and insulation resistance, dielectric strength requirements. Available in Spanish from Bur. of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

References.—*See* references under 711.25.

711.4 ACCESSORIES AND PARTS FOR MOTORS AND GENERATORS

711.42 Carbon Brushes for Motors and Generators

Society of Automotive Engineers. 1931 Handbook. Recommended Practice. Brushes; 1921. For starting motors and lighting generators, increments of variation in dimensions, and maximum tolerances in dimensions.

U. S. Gov., Dept. of Commerce, Bureau of Standards. R56–28; 1928. Carbon Brushes and Brush Shunts. Simplified practice recommended and accepted by industry establishing a standard schedule of sizes and dimensions of carbon brushes and brush shunts, dimensions and tolerances of round and rectangular brushes, standard bevels and chamfers, lengths, sizes and stranding of shunts, sizes of terminals on shunts.

712. BATTERIES AND ELECTROPLATING APPARATUS

712.0 GENERAL ITEMS

American Railway Assn. Signal Section. Maintaining and Handling Dry Cells; 1927. General characteristics of ignition and heavy service cells, general purpose cells and telephone cells, interpretation of voltage and short circuit readings, maintenance, storage, effect of temperature.

Assn. of Railway Electrical Engineers. 1929 Manual C–III; 1928. Recommended Storage Battery Installation and Maintenance Practice. Construction of mastic acid-resisting floors for battery room, assembly, installation, charging, and maintenance of lead-acid and of nickel-iron storage batteries.

712.1 PRIMARY BATTERIES

American Railway Assn. Signal Section 8720; 1921. Type A Caustic Soda Primary Cells and Renewals. Dimensions of jars, bolts, and nuts, jars and bolts according to A. R. A. specifications, test requirements for capacity and operating voltages.

American Railway Assn. Signal Section 12623; 1923. Cylindrical Dry Cells. Salammoniac cells with depolarizer and nonspillable electrolyte in zinc container, dimensions, nonflow requirements for sealing compound, voltage rating, useful life test requirements for light intermittent, heavy intermittent, and continuous discharge tests.

American Railway Assn. Telegraph and Telephone Section. 2–G–23; 1927. Dry Cells. Dry cells No. 6 for telephone and telegraph, ignition, etc., salammoniac cells, construction, solidity requirements of sealing compound, dimensions of cells, useful life test requirements by light intermittent, heavy intermittent, and shelf tests.

Electrochemical Society. Standardization of Tests for Dry Cells Used in Radio Receiving Sets; 1924. Recommended tests for filament or A batteries and for plate or B batteries, type of voltmeter required, standard temperature.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 331–111. Dry Cell "A" Batteries. Requirements on methods of test for heavy load test and for light load test, standard location of terminals and recommended markings, standard dimensions and recommended shape.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 331–112. Dry Cell "B" Batteries. Requirements on methods of making continuous and intermittent load tests, standard designations for various types and sizes of batteries, standard location and marking of terminals, standard dimensions.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 331–113. Dry Cell "C" Batteries. Requirements on method of making life test, standard designations for various types and sizes, standard type, location, and marking of terminals, standard dimensions.

Radio Manufacturers Assn. (Inc.). M2–151, and M4–411 to M4–423, incl.; 1930. Dry Cells. For dry cell A batteries, requirements on maximum dimensions and location of terminals, recommended practice on type of and marking of terminals, maximum current drain in use, shape of carton, methods of test for heavy and light load tests.

Radio Manufacturers Assn. (Inc.) M2–152 and M4–411 to M4–423, incl.; 1930. Dry Cells. For dry cell B batteries and C batteries, standard designations of types for various sizes and arrangement of cells, standard location and marking of terminals, maximum dimensions, methods of test for continuous and intermittent load tests for B batteries and for life test of C batteries.

U. S. Gov., Dept. of Commerce, Bureau of Standards R104–30; 1930. Packaging of Flashlight Batteries. Simplified practice recommended and accepted by industry establishing a standard packaging for flashlight cells, number of cells per package for small size cell and for large size cell for 3 standard packages.

U. S. Gov., Dept. of Commerce, Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels. Flash Lights and Batteries. As life boat equipment on ocean and lake vessels, for an all-metal 3-cell flash light, mandatory requirements on general construction of sal ammoniac type batteries.

U. S. Gov., Federal Specifications Board W–B–101; 1931. Approved as regards technical requirements, by American Standards Assn. as C18–1930. Dry Cells and Batteries. Covers No. 6 cell for general purposes, for telephone service, and for radio "A" battery, assembled batteries of No. 6 cells, flashlight cells and batteries, radio "B" batteries, and radio "C" batteries. Requirements on standard dimensions, construction, materials, voltage test and capacity tests on intermittent and continuous loads.

References.—Maintenance and handling dry cells. *See* 712.0. Gravity battery coppers and zincs. *See* 712.5. Sal ammoniac, copper sulphate. *See* 831.4, 839.33. Caustic soda. *See* 834.8. Battery boxes. *See also* 712.3. Flash lights. *See also* 716.13.

712.2 STORAGE BATTERIES

American Institute of Electrical Engineers. Standard No. 36; 1928. Approved by American Standards Assn. as C40–1928. Storage Batteries. Construction, definitions of parts, of capacity, voltage, charging, discharging, efficiency, and rating.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Auxiliary Lighting and Power Batteries. Recommended requirements on life of battery for lead and alkaline types, connection of lead plates, current carrying capacity of connecting bars, marking of terminals, type and number of wood and rubber separators, flow test of sealing compound, jars and cell covers of hard rubber, spill test for portable and nonportable types, construction of wood containers for cells, provision of porcelain skids and container separators.

American Railway Assn. Signal Section 4915; 1915. Nickel-Iron Alkaline Storage Battery. Standard capacities and definition of rating, dimensions and weight, charging and discharging test requirements, weight of electrolyte required.

American Railway Assn. Signal Section 5328; 1928. Storage Battery. Stationary composite type lead batteries for signaling service, dimensions, standard capacities and definition of rating, construction of pure lead positive plate and of pure lead or pasted type negative plate, dimensions of glass jars, trays, and covers, wood separators, gravity and amount of electrolyte, charging and discharging tests.

American Railway Assn. Signal Section 5828; 1928. Storage Battery. Pure lead type stationary battery for signaling service, dimensions, standard capacities and definition of rating, dimensions of rolled or cast Plante type plates, of glass jars, trays and covers, of wooden separators, gravity and amount of electrolyte, charging and discharging test.

American Railway Assn. Signal Section 8820; 1921. Lead Type Portable Storage Battery for Signaling. Standard capacities, 72-hour test requirements for rating, dimensions, construction, materials, and assembly requirements for wooden case and cover, rubber jar and cover, grids, wooden and rubber separators, strength and elongation of rubber for jars, gravity of electrolyte, acid proofness and fluidity of sealing compound.

Assn. of Edison Illuminating Companies. Manual of Storage Battery Practice; 1926. Description, installation practice, application as stand-by source of power for power systems, operation, maintenance and repairs of stationary batteries, description and operation of vehicle batteries.

Automotive Electric Assn. Standard Ratings for Storage Batteries; 1925. For 6 volt passenger car batteries, requirements on voltage current discharge characteristics for 4 sizes of batteries.

National Battery Mfrs. Assn. Cold Weather Performance Test; 1930. Tentative standard rating tests for starting batteries for cold weather performance and for room temperature performance.

National Battery Mfrs. Assn. Recommended Dimensions for Battery Case Compartments. Undated. A blueprint showing recommended dimensions and tolerances with compartment lengths in conformity with Soc. of Automotive Engrs. standards.

National Battery Mfrs. Assn. Standard Bushing Type Covers; 1930. Blueprint showing dimensions of 2 types of standard cell covers for storage batteries, position of positive terminal marking shown.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 128–215. Storage Batteries, For Use in Mining and Industrial Locomotives. For capacity based on 6-hour rating, requirements on minimum thicknesses of tray parts, tensile strength and elongation of material of hard rubber jars, dimensions of 4 classes of hard rubber jars, design of 4-rib and of 2-rib types.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 332–311. Storage "A" Batteries. Definition of ampere-hour rating based on 100-hour discharge rate, requirements on type and marking of terminals.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 332–311. Storage "B" Batteries. Definition of milliampere hour rating based on 200-hour discharge rate, recommended number of cells in each unit, requirements on type and marking of terminals.

Radio Manufacturers Assn. (Inc.). M4–451 to M4–454, incl.; 1930. Storage Batteries. Definitions of standard capacity rating for storage "A" batteries and for storage "B" batteries, number of cells in storage "B" batteries, marking of terminals.

Society of Automotive Engineers 1931 Handbook. Aircraft Storage Batteries; 1929. For lead acid storage batteries, definitions of ratings, requirements on dimensions and allowable weight, 5-hour rating, and 20-minute rating for 3 sizes of 6-cell batteries.

Society of Automotive Engineers 1931 Handbook. Storage Batteries; 1928. For lead-acid storage battery, definition of two ratings for lighting service and starting service, respectively, location and polarity of terminal posts, dimensions of terminal posts, requirements of battery compartments, and holding down devices, dimensions of batteries for passengers, for motor trucks, and for motor coaches.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Storage Battery Ratings for Isolated Electric Lighting Plants; 1923. Definition of rating for continuous rating and for intermittent rating, method of test for determining intermittent rating.

U. S. Gov., Dept. of Commerce, Bureau of Mines, Schedule 2C; 1930. Explosion Proof Mine Equipment. Battery Boxes and Batteries. Requirements for approval for use in gassy and dusty mines, including requirements on ventilation, insulation of trays from battery box, strength of materials in battery box, provision of locked cover.

U. S. Gov., Federal Specifications Board W–B–131; 1930. Storage Batteries for Ignition, Lighting, and Starting. For several sizes of 3-cell and 6-cell batteries for automobiles, motor trucks, and motor coaches, requirements on over-all dimensions, arrangement of cells, current ratings, construction, type of separators, dimensions of plates and terminal posts, purity and density of electrolyte, material and test requirements for cell jars and battery cases, methods of testing.

References.—Installation and maintenance. *See* 712.0. Battery boxes. *See also* 712.3. Battery terminals and lugs. *See also* 712.9. Sulphuric acid. *See* 821.7. Caustic soda. *See* 834.8.

712.3 BATTERY CASES

American Railway Assn. Signal Section. 8820; 1921. Lead Type Portable Storage Battery for Signaling. Includes hard rubber jars and covers for batteries, dimensions and construction, high temperature resistance, tensile strength and elongation requirements.

American Railway Assn. Signal Section 8820; 1921. Lead Type Portable Storage Battery for Signaling. Includes wooden outer case and case cover, of oak, maple, beech, birch, or ash, dimensions, construction and assembly, size and application of reinforcement strap and bolt, bail handle and painting requirements.

American Railway Assn. Signal Section 11328; 1928. Battery Jar. Dimensions, solubility in caustic soda, heating, and chilling test requirements, for primary signal batteries, material glass.

American Railway Assn. Signal Section 11622; 1922. Cement Concrete Battery Box. Dimensions of box, size, type, and placing of reinforcement, general quality of sand, quality and size of stone or gravel, mixing proportions and consistency of concrete, construction of sheet iron covered wooden top cover, painting, test requirements for strength and leakage of box, and for humus content of sand.

American Railway Assn. Signal Section 11728; 1928. Battery Jar. For storage battery, dimensions, test requirements for heating and chilling, material glass.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Storage Battery Monobloc Containers; 1926. Dimensions for six compartment and for three compartment containers of two standard heights and various lengths.

Society of Automotive Engineers 1931 Handbook. Storage Battery Jars for Electric Vehicles; 1921. Tensile strength and elongation requirements of hard rubber for hard rubber jars, dimensions of two and four ribbed jars for both passenger cars and trucks.

U. S. Gov., Dept. of Commerce, Bureau of Mines Schedule 2C; 1930. Explosion Proof Mine Equipment. Battery Boxes and Batteries. Requirements for approval for use in gassy and dusty mines, including requirements on ventilation, insulation of trays from battery box, strength of materials in battery box, provision of locked cover.

U. S. Gov., Federal Specifications Board W–B–131; 1930. Storage Batteries for Ignition, Lighting, and Starting. Includes cell jars and battery case specifications. For hard rubber cell jars, test requirements for electrical breakdown, tensile strength and elongation; for battery cases, test requirements for distortion, resistance to impact, electrical breakdown, and acid absorption.

References.—Wood containers for cells, glass jars, battery trays and covers. *See also* 712.2. Methods of testing rubber goods. *See* 200.

712.4 BATTERY ELECTROLYTE

References.—Sulphuric acid, sal ammoniac. *See* 821.7, 831.4. Caustic soda, copper sulphate. *See* 834.8, 839.33.

712.5 BATTERY ANODES AND CATHODES

American Railway Assn. Signal Section 3328; 1928. Gravity Battery Coppers. For 2 or 3 leaf coppers, gage and purity of copper leaves, size and insulation of copper lead wire, rivet and washer requirements, dimensions and assembly of leaves.

American Railway Assn. Signal Section 3428; 1928. Gravity Battery Zincs. Dimensions, weight, chemical composition.

712.9 MISCELLANEOUS BATTERY ACCESSORIES

Society of Automotive Engineers 1931 Handbook. Storage Battery Terminals; 1928. Dimensions of cable type and of strap type terminal.

713. TRANSFORMERS, ELECTRIC CONVERTERS AND CONDENSERS

713.1 ELECTRIC CONDENSERS, STATIC

American Institute of Electrical Engineers. Report on Standards for Capacitors (No. 18); 1930. Committee report recommending standards including definitions, classification, and rating of capacitors, permissible current leakage, requirements on ground test.

National Board of Fire Underwriters. National Electrical Code; 1931. Capacitors (Static Condensers). Requirements for installation, inclosure, and grounding.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 334–011. Fixed Paper Capacitors. Test requirements for voltage breakdown and insulation resistance tests, tolerances on capacitance, standard working voltages, standard dimensions of metal containers, standard type terminals, standard size capacitor-paper roll.

Radio Manufacturers Assn. (Inc.). M2–114, and M4–311 to M4–317, incl.; 1930. Fixed Paper Capacitors. Requirements on conductor current allowed and insulation resistance, voltage test, methods of test, diameter of standard roll of capacitor paper, tolerance on rated capacity, standard working voltages for direct current and for alternating current.

References.—Definitions, symbols, rating basis, standard voltages and frequencies, methods of test, safety code. *See also* 710.

713.2 SYNCHRONOUS CONDENSERS AND CONVERTERS

American Institute of Electrical Engineers Standard No. 8; 1925. American Standards Assn. C 21–1926. Synchronous Converters. Does not include frequency or rotary phase converters. Definitions, protection, ventilation, duty, rating, heating limits, temperature tests, over-load, commutation, power factor, and over-speed limitations, measurement of efficiency, tests of dielectric strength and insulation resistance. No limits stated for efficiency. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG18–15. Frequency Converters and Motors Above 60 Cycles for Industrial Purposes. For frequency converters up to 180 cycles, recommended practice on voltage and frequency ratings, on temperature rise, recommended voltage regulation for frequency converters for wood working machinery and machine tools.

References.—Definitions, symbols, rating standards, voltage and frequency standards, methods of test, protection, safety codes. *See also* 710, 711.20. Brushes. *See* 711.42. Alternating current motors. *See* 711.21. Cast iron, forged steel, shafts. *See also* 611.11, 611.51, 611.52. Plain bearings, ball and roller bearings. *See* 692.3, 766.2. Copper wire. *See* 715.44.

713.3 DYNAMOTORS

713.4 MOTOR GENERATORS

National Electrical Manufacturers Assn. Motor and Generator Standards; 1930. Rule MG20–10. Synchronous Motor Generator Sets, 200 kw. and Larger. Standard voltage, output, and speed ratings for 2-unit and 3-unit sets, requirements on overload capacity, permissible temperature rise, operation at 0.8 power factor.

References.—Motors, alternating current. *See* 711.21. Generators, direct current. *See* 711.12. Synchronous converter. *See* 713.2. Electric welding machines. *See* 767. *See also* references under 711.21 and 711.12.

713.5 TRANSFORMERS

American Institute of Electrical Engineers. Standand No. 12; 1930. Constant Current Transformers of the Moving Coil Type. Definitions, permissible temperature rise and methods of measurement, requirements on dielectric test and lead markings.

American Institute of Electrical Engineers. Standard No. 13; 1930. Transformers, Induction

Regulators and Reactors. Not including instrument transformers, testing, series street lighting, ignition, radio, small special transformers or autostarters. Definitions and classification of apparatus including duty and rating classification, permissible temperature rise and method of measurement, requirements on short circuit capacity and dielectric strength, test methods including those for measurement of efficiency and regulation, standard lead markings for transformers. 1925 edition is available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers Standard No. 14; 1925. American Standards Assn. C 22–1925. Instrument Transformers. Definitions, rating, heating measurement and limits, short-circuit and open-circuit limits, dielectric test, polarity and terminal markings. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers Standard No. 100; 1930. Recommendations for the Operation of Transformers. Recommendations on limiting oil temperature, operation at rated load, operation at high cooling medium temperatures, and operation at greater than rated load.

American Institute of Electrical Engineers. Proposed Test Code for Transformers, Preliminary Report; 1931. Covers the more generally applicable and accepted methods of conducting and reporting tests of a commercial nature, including resistance measurements, ratio test, polarity, no-load loss and exciting current, load loss and impedance voltage, temperature test, dielectric test, regulation, efficiency.

American Railway Assn. Signal Section 8330; 1930. Single-Phase, Air-Cooled Track Transformer. Requirements on terminal board and connection construction, aging test for core material, insulation and surface leakage distance, size of leads, tests for dielectric strength, excess voltage, exciting current, temperature rise, polarity, voltage ratio, and regulation, using methods of test of Am. Inst. of Elec. Engrs.

American Railway Assn. Signal Section 8431; 1931. Line Transformer, Oil Immersed, Self-Cooled. General design requirements for case, terminals and connections, composition and fluidity of sealing compound for bushings, aging test for core material, insulation of coils, test requirements for exciting current, voltage ratio, polarity, regulation, dielectric strength, and temperature rise.

American Railway Assn. Signal Section 10720; 1921. Switchboard. Includes instrument transformers, load capacity and high voltage test requirements in accordance with Am. Inst. of Elec. Engrs. standards, requirements on ability to withstand high temperature, on overload capacity of current transformers, secondaries rated 5 amperes for current transformers and 110 volts for potential transformers.

American Railway Assn. Signal Section 14328; 1928. Transformers. For signal lighting and for operation of rectifiers for charging storage batteries, standard primary voltages from 115 to 575 volts, type of insulation, surface leakage distance, test requirements for dielectric strength, excess applied voltage, exciting current, voltage ratio, polarity, regulation and temperature rise.

Assn. of Edison Illuminating Companies. Joint sponsor with National Electric Light Assn. and Nat. Bureau of Standards. Approved by American Standards Assn. as C 12–1928. Code for Electricity Meters. Includes current transformers for meters, high voltage test requirements for the insulation, temperature rise according to A. I. E. E. standards, allowable errors in ratio and phase angle for different loadings, and also due to effect of polarization.

Assn. of Edison Illuminating Companies. Joint sponsor with National Electric Light Assn. and Nat. Bureau of Standards. Approved by American Standards Assn. as C 12–1928. Code for Electricity Meters. Includes voltage transformers for meters, high voltage test requirements for insulation, temperature rise according to A. I. E. E. standards, allowable phase angles and deviations in ratio for various loads, power factors and voltages.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Auto-Transformers. Protection of live parts, internal clearances in case, oil level indication, number of switch positions, operating, and grounding requirements.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Transformers. For 600 volts or less, requirements for inclosures for oil filled transformers in buildings, and for air space about air cooled transformers, grounding. For over 600 volts, permissible location, provisions of circuit breakers and control apparatus, isolation of control apparatus, protective apparatus for service wiring, construction, materials, and design of transformer vaults.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 122.2–150. Transformers for Lighting and Power Service. Classification, standard kilovolt-ampere and voltage ratings and tap provisions, permissible temperature rise, use of Am. Inst. of Elec. Engrs. methods for temperature test, methods for testing voltage regulation and efficiency, dielectric test requirements for windings and for oil, induced voltage test requirements, standard lead markings, connections, polarities and accessories.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 124–810. Oil Circuit Breaker Bushing Type Current Transformer. Standard number of taps, standard current ratings, standard method of marking polarity taps.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 126.2–60. Instrument Transformers. For current and potential instrument and tripping transformers, types and forms, requirements on ratio accuracy, on short circuit and open circuit limitations of current transformers, permissible temperature rise and method of test, requirements on dielectric test of transformers and transformer oil, on polarity standard and marking, on standards for primary terminals for current transformers.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 322–511. Audio Apparatus for Receivers. Requirements on insulation resistance and method of test, standard arrangement and marking of radio and audio transformers, recommended practice on insulation and electrolysis test of audio transformers, resistance standards for output transformers and inductors, requirements of temperature test and method of making ratio and quality tests of audio transformers.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 333–418. Transformers for Socket Power Units for Receiving Sets. Requirements on insulation of primary, and provision of non-combustible materials in construction excepting insulation.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. Oil Circuit Breakers. 1931. Includes bushing type current transformers for circuit breakers, requirements on number of taps, standard current ratings of primary, standard turn ratios, standard method of identifying leads, standard transformer connections.

Radio Manufacturers Assn. (Inc.). M2–113 and M2–131; 1930. Audio Transformers. Methods of test for determining the effect of moisture on audio transformers and for measuring the amplification per stage.

Underwriters' Laboratories. Transformers; 1931. For air-cooled transformers for general use with ratings of 600 volts or less and 10 kva. or less, requirements on thickness of metal and construction of inclosures, mounting, treatment of coils, size and insulation of connecting leads, acceptable types of terminals and terminal mountings, heating test, dielectric test, and overload test.

Underwriters' Laboratories. Industrial Control Equipment; 1931. Includes auto-transformer starter, requirements on number of operating positions, operating characteristics, load test and temperature rise allowances for various parts, dielectric strength test.

Underwriters' Laboratories. Transformers; 1931. For bell ringing transformers, requirements on thickness of metal and construction of inclosures, mounting, treatment of coils, sizes, types, insulation, and installation of connecting leads and terminals, voltage ratings, open circuit voltage, primary input limit, heating and dielectric test, for 2-coil type.

Underwriters' Laboratories. Transformers; 1931. For gas tube sign transformers, 2-coil type, requirements on thickness of metal and construction of inclosures, treatment of coils, types, spacing, and mounting of terminals, sizes and spacing of leads, grounding, maximum voltage ratings, open circuit voltage and input test, short circuit, heating, dielectric, and open circuit tests.

Underwriters' Laboratories. Transformers; 1931. For oil burner ignition transformers, 2-coil type, requirements on thickness of metal and construction of inclosures, treatment of coils, sizes, types, insulation, and spacing of connecting leads and terminals, grounding, tests for open circuit secondary voltage, input, endurance, heating, dielectric strength, and short circuit, for high voltage and low voltage types.

Underwriters' Laboratories. Transformers; 1931. For toy transformers, 2-coil type, requirements on design and thickness of metal of inclosure, mounting, treatment of coils, length, insulation, and attachment of flexible cord, sizes and mounting of terminals, voltage ratings, open circuit voltage, input and output limits, tests for dielectric strength and heating.

References.—Transformers for electric arc and resistance welding apparatus. *See* 767. Definitions, symbols, rating standards, voltage and frequency standards, methods of test, safety codes. *See also* 710. Transformer oil. *See also* 504.8. Auto transformer starters. *See also* 714.11. Cast iron, malleable cast iron. *See* 711.11, 711.21. Sheet steel. *See* 604.2. Copper wire. *See* 715.44.

713.6 CHOKE COILS, IGNITION COILS

Automotive Electric Assn. Ignition Coil and Timer Test; 1925. Test procedure and set up of apparatus using calibrated spark gap and testing at various voltages applied to ignition coil.

Radio Manufacturers Assn. (Inc.). M4–251; 1930. Inductors. Recommended practice on rating in henries and frequency for alternating voltage and direct current and on giving the direct current resistance.

References.—Definitions, symbols, frequency standards, methods of test, safety codes. *See also* 710. Impedance track bonds and reactors. *See* 718.49. Choke coils for lightning protection. *See* 715.50. Reactors. *See* 713.5.

713.7 RECTIFIERS

American Railway Assn. Signal Section. Maintaining and Operating Rectifiers; 1930. Instructions for maintaining and operating motor-generators, mercury arc rectifiers, gas tube rectifiers, mechanical or vibrating rectifiers, electroyltic rectifiers, copper oxide rectifiers, alternating current floating storage battery system.

References.—Rectifier bulbs. *See* 718.62. Synchronous converters. *See* 713.2.

714. SWITCHES, PANELS, METERS, AND CONTROLLING EQUIPMENT

714.1 CONTROLLING EQUIPMENT

714.11 Electric Controllers and Starters

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Controllers. Requirements on protection, temperature rises in circuit breakers and contactors, voltage operating range for contactors, operation of tripping devices and contactors under vibration and at inclined angles, permissible temperature rises in resistors, dielectric strength test.

American Institute of Electrical Engineers. Standard No. 15; 1928. American Standards Assn. C 19–1928. National Electrical Mfrs. Assn. Industrial Control Apparatus. Includes motor, industrial heating, and generator field control, and auto starters, but excludes control apparatus for marine auxiliaries and propulsion, mine locomotive and railway control. Classification of controllers, switches, resistors, relays; definitions, duty classification, rating, heating limits and measurement, range of operation, and dielectric test. 1925 edition available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 16; 1925. Approved by American Standards Assn. as C36–1928. Railway Control and Mine Locomotive Control Apparatus. Definitions and classification of controllers, switches, resistors, current collectors, relays, etc., rating, heating limits and measurement, range of operation, dielectric test. Available in Spanish from Bureau of Foreign and Domestic Commerce, U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Report on Standards for Railway Control Apparatus; 1930. A proposed revision of Standard No. 16; 1925.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Control, Direct Current. For other than propulsion equipment control, recommendations on general structural features for manual and for magnetic types, standard voltages, drip proof inclosing cases, operating features of manual control, corrosion and vibration resisting qualities of resistors, noncorrodible small parts, limits of temperature rise for various parts, voltage operating range of contactors, operation at inclined angle and resistance to vibration features for contactors and circuit breakers, spare part list, type of control applicable to various auxiliaries.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Control Equipment, Propulsion. For alternating current turbine electric drive and for Diesel electric drive, recommendations on mounting and material of switchboard, protection about live parts, types and vibration proof qualities of switches, ground detector and meter equipment, strength, and interlocking of switch operating levers, minimum size of instrument wiring, overload protection for direct current generators, etc., testing in accordance with A. I. E. E. standards 15 or 27.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Manual Starters and Controllers, Alternating Current. For starting squirrel cage motors, recommendations on provision of self-contained auto-transformers, break action of switch, operating features of lever, overload and low voltage protection, type of switch, spill test for oil type switch, temperature rise tests.

American Railway Assn. Mechanical Div. Recommended Practice. Axle Generator Equipment; 1930. Includes automatic generator regulator and lamp regulator for controlling charging of battery and supplying proper voltages for lights, recommendations as to the operating characteristics and regulatory requirements for each.

American Railway Assn. Signal Section 13029; 1929. Drawbridge Circuit Controller. For control of connection of electrical circuits between shore spans and bridge ends, purchaser to furnish drawings, minimum stroke of movable member, general structural requirements, types of binding posts and contacts, surface leakage distance and dielectric test requirements.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Includes direct current and alternating current controllers, reversing drum or flat type, permissible temperature rise, minimum number of acceleration steps, for automatic and remote control controllers, slate panels on angle iron frames, equipment on panel, interlock requirements, construction and operation of master controller, for a. c. controllers range in voltage at which operative.

Associated Factory Mutual Fire Insurance Companies. Centrifugal Fire Pumps; 1931. Controllers for starting and operating electric motors driving pump, requirements on type, rating, and operating features of switches, circuit breakers, fuses, etc., requirements for inclosures, for manual, and combined manual and automatic types of controllers.

Assn. of Iron and Steel Electrical Engineers. A. c. Motors for Main Roll Drive. Undated. Includes specifications for liquid slip regulator for control of large induction motor, general construction, requirements on range of adjustment and range of resistance, accuracy of setting markings, and temperature rise.

Assn. of Railway Electrical Engineers 1929 Manual. Electric Train Lighting; 1928. Includes generator regulator and lamp regulator for axle generator, mounting and wiring requirements for panels, operating characteristics requirements for regulator, rating and insulation test requirements.

Underwriters' Laboratories. Industrial Control Equipment; 1931. Requirements on types and application of inclosures, thickness of metal, mesh of wire screening, mounting and operation of switches, types, ratings, and operating features of fuses and relays, protection features against low voltage, phase failure, and phase reversal, types of wire and terminals, spacing of live parts, standard ratings, capacity requirements and tests of contactors, capacity and load tests of starting and continuous duty resistors, load test and temperature rise of auto-transformer starters, dielectric test of current carrying parts of controller, for controllers for use in hazardous locations, requirements on strength of inclosures, length of path in joints, explosion tests.

U. S. Gov., Dept. of Commerce. Bureau of Mines. Schedule 2C; 1930. Explosion Proof Mine Equipment. Controllers. Requirements for approval for use in gassy and dusty mines, including provision of explosion proof casing, clearance of live parts, construction for lead entrances, inclosure joints and bolting, inspection openings and covers, thickness of walls, resetting provisions, explosion tests, etc.

U. S. Gov., Dept of Commerce, Bureau of Standards. H7; 1926. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the Installation and Maintenance of Electric Utilization Equipment. For control equipment accessible to other than qualified electrical operators, requirements on thickness of metal in inclosure, clearances for live parts, overload protection, provision of lock for the "off" position, etc.

References.—Brakes for electric motors. *See* 711.21, 711.22. Auto transformers. *See also* 713.5. Starting rheostats. *See also* 714.12. Track circuit controllers for railroad signals. *See* 718.42. Definitions, symbols, rating basis, standard voltages and frequencies, methods of test, installation, safety code. *See also* 710. Relays. *See also* 718.43. Panels and switchboards. *See also* 714.4. Fuses, meters. *See also* 714.2, 714.3. Switches and circuit breakers. *See also* 714.5. Automatic stations. *See* 714.13.

714.12 Resistors and Rheostats

American Institute of Electrical Engineers. Standard No. 15; 1928. Joint sponsors with National Electrical Mfrs. Assn. under auspices of American Standards Assn. A. S. A. No. C 19–1928. Industrial Control Apparatus. Includes motor, industrial heating, and generator field control, and auto starters, but excludes marine, mine locomotive, and railway control. Classification of controllers, switches, resistors, relays; definitions, duty classification, rating, heating limits and measurement, range of operation, dielectric test. 1925 edition available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 16, 1925. Railway Control and Mine Locomotive Control Apparatus. Includes resistors, definitions, classification, rating, heating limits and measurement, range of operation, dielectric test requirements. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Railway Assn. Signal Section 10628; 1928. Resistor. Rating to give total resistance, resistance between taps, minimum resistance, and continuous current capacity, permissible temperature rise at rated current, insulation and conductor requirements, surface leakage distance, test requirements for dielectric strength and for excess voltage.

American Railway Assn. Telegraph and Telephone Section. 2–G–24; 1927 and 2–G–25; 1927. Resistance Units ARA–6–B and ARA–8–B. 1,500 ohm, 0.051 ampere unit, and 275 ohm, 0.147 ampere unit for use in ferrule type mountings, protected winding of resistance wire on porcelain tube fitted with brass ferrules, construction and dimensions, test requirements for agreement with rating, for variation of resistance with temperature, for rise in temperature, and for behavior with overload.

American Railway Assn. Telegraph and Telephone Section. 2–G–31; 1928. Resistance ARA–2–A. For resistance wire wound on an insulating core, mechanically protected and fitted with medium size Edison base, covers 26 sizes from 10 to 5,000 ohms and current ratings of 1 to 0.045 ampere, main dimensions, variation of resistance from rating, test requirements for variation of resistance with temperature, continuous carrying capacity, and behavior with overload.

American Railway Assn. Telegraph and Telephone Section. 4–13; 1927. Protective Resistances and Mountings. For protection of telegraph and telephone plant against currents from operating voltages, includes resistances with ferrules or lugs, those with terminals for fitting into sockets, and resistance lamps, current carrying capacity requirements of resistance, insulation resistance and dielectric strength requirements of mountings, general requirements for materials.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Includes rheostats for motor controllers, of cast grid type for current above 25 amperes, permissible temperature rise for 5 minutes of maximum load, mounting, insulation and provision for removal of parts, to comply with standardization rules of American Institute of Electrical Engineers.

American Society for Testing Materials. Tentative Method of Test. B77–30T; 1930. Test for Thermoelectric Power. For determining the suitability of different metals for use in resistance apparatus in which a low thermoelectric power is desired, measurement made with respect to copper, definition of thermoelectric power, requirements on form of test specimen and test procedure.

Assn. of Iron and Steel Electrical Engineers. A. c. Motors for Main Roll Drive. Undated. Includes grid resistors for control of large induction motor, requirements on rigidity, current carrying capacity for regulating, accelerating, and plugging portions with specified temperature rises.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Resistors and Reactors. Requirements regarding noncombustible supports, air space about resistors, marking of terminals, operating, and design requirements for motor starting rheostats, insulation and installation of connecting wires, requirements on mounting and inclosures, mounting of resistance lamps.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 322–411. Resistors. Recommended practice on filament resistor marking and method of mounting on panel, standard marking of radio resistors, requirements on accuracy of rating, dimensions of grid resistor.

Radio Manufacturers Assn. (Inc.). M4–211 to M4–212; 1930. Resistors. Standard designations for the resistance of resistors, permissible variation from rated resistance.

Underwriters' Laboratories. Industrial Control Equipment; 1931. Includes operating characteristics of starters, full load and overload test requirements for starting resistors and continuous duty resistors.

U. S. Gov., Dept. of Commerce, Bureau of Mines. Schedule 2C; 1930. Explosion Proof Mine Equipment. Rheostats. Requirements for approval for use in gassy and dusty mines, including provision of explosion proof casing, thickness of walls, entrance of leads, casing joints and bolting, clearance of live parts, explosion tests, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards LC221; 1927. Tests of Resistance Apparatus. Structural and design features considered essential for precision resistance apparatus submitted to the bureau for test and certification, including low temperature coefficient, small thermoelectromotive force against copper, accuracy of adjustment, type of support, dissipation of heat, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards S107; 1908. A New Form of Standard Resistance. Describes the design and construction of resistance standards made of wire coils immersed in oil and sealed in a brass cylinder, with test data showing constancy of resistance values. They do not displace primary resistance standards but make frequent reference to them unnecessary.

References.—Definitions, symbols, rating basis, methods of test, marking of terminals, service standards, safety codes. *See also* 710. Resistance wire. *See also* 715.43. Cast iron. *See* 611.11. Porcelain for electrical purposes. *See* 532.22.

714.13 Automatic Stations

American Institute of Electrical Engineers. Standard No. 26; 1930. Automatic Stations. Definitions, rating, heating limitations and measurement, sequence and adjusting test, device function numbers.

Refercnces.—Definitions, symbols, rating basis, voltage and frequency standards, methods of test, service standards, safety codes. *See also* 710. Automatic switchgear. *See also* 714.50.

714.14 Relays.

American Institute of Electrical Engineers. Report on Standards for Relays, No. 23; 1931. Committee report covering relays used in power transmission and distribution field, standard definitions, duty classification, voltage ratings, temperature rise limits, operation at variations from rated voltage, dielectric test requirements.

Referenees.—Track and railway signal relays. *See* 718.43. Definitions, symbols, rating basis, voltage and frequency standards, methods of test, service standards, safety codes. *See also* 710.

714.2 FUSES AND FUSE HOLDERS

714.21 Fuses

American Railway Assn. Mechanical Div. Recommended Practice. Car Lighting; 1927. Includes open end ribbon type link fuses, recommended dimensions and design for 100 to 200 amperes, 250 volts.

American Railway Assn. Signal Section 9630; 1930. Fuses. Fuses for signal purposes, requirements on design of casing, types of contacts, and labeling of capacity for various ratings of inclosed fuses, type of cap opening in plug fuses, types of contacts for link fuses and for plug fuses, ratings of fuses and test requirements on ratings, dimensions in conformity with National Electric Code.

American Railway Assn. Signal Section 10720; 1921. Switchboard. Includes fuses of 250 volt and 600 volt classes, dimensions of screw contact type, ferrule type, and knife blade type of cartridge inclosed fuses of various capacities.

American Railway Assn. Telegraph and Telephone Section. 4–3; 1924. Line Fuses for Telegraph and Telephone. Tubular type, readily replaceable for 7 to 15 amperes, meeting the requirements of National Electrical Code for "fuses of signaling system protectors," current carrying capacity test requirements.

American Railway Assn. Telegraph and Telephone Section. 4–6; 1924. Instrument Fuses. For protection of railroad telegraph and telephone plant, for capacities of 1 ampere or less, readily replaceable type, operating and current capacity test requirements, maximum allowable resistances for various sizes.

American Railway Assn. Telegraph and Telephone Section. 4–7; 1924. Heat Coils. For protection of telephone instruments and wiring, readily replaceable type, for capacities of 0.2 to 1 ampere, capacity, operating, and maximum resistance requirements for various sizes.

Assn. of Railway Electrical Engineers. 1929 Manual. Electric Train Lighting; 1928. Includes open-end link fuses and fuse holders, design and over-all dimensions for 60 to 200 amperes at 250 volts for use on panels or in battery boxes.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Inclosed Fuses. Construction of casings, marking and labeling, dimensions of standard N. E. C. inclosed fuses, approved applications of ferrule and knife types, fuse sizes for lighting, appliances, and motors.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Link Fuses. Allowable capacities, construction of tips, rating, clearances required, approved applications.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 124–900. Fuses and Fuse Mountings for 2,500 Volts and Above. Standard color for porcelain insulators, standard maximum ampere ratings of primary fusible cutouts and of fuse links not including inclosed fuses, standard interrupting capacities of primary fusible cutouts for outdoor applications, standard voltage ratings.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 226. Cartridge Inclosed Fuse Standards. Covers renewable and nonrenewable type, ampere and voltage ratings to which ferrule contact and knife-blade contact apply, materials, construction, dimensions and tolerances, marking with colored labels, temperature test, rating test, and short circuit test requirements.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. SG–910. Distribution Cutouts. Renewable inclosed cutouts for 15,000 volts and below, requirements on information to be included in rating, basis of ratings, standard current ratings for cutout and standard current ratings for fuse links, standard voltage ratings, standard dimensions of universal fuse links.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. SG8–70. High Voltage a. c. Fuse Cutouts. Requirements on information to be included in rating, basis of current rating and standard current ratings, basis of voltage rating and standard voltage ratings, for 7,500 volts and above, for other than renewable fuse cutouts for distribution service.

Society of Automotive Engineers 1931 Handbook. Fuses and Fuse Clips; 1926. For circuits up to 40 volts and 30 amperes, dimensions of cartridge type fuses and fuse clips, requirements as to marking, visual indicator of blown fuse, continuous current carrying capacity, fusing current, and temperature rise when carrying rated current.

Underwriters' Laboratories. Cartridge Inclosed Fuses; 1928. Covers renewable and nonrenewable cartridge inclosed fuses of ferrule and knife-blade types. Type of contact for various capacities, materials and construction of tubes, ferrules, caps, and fuse connections, dimensions and tolerances, labeling, test requirements for current rating, temperature rise, and short circuit.

U. S. Gov., Dept. of Commerce, Bureau of Mines. Schedule 2C; 1930. Explosion Proof Mine Equipment. Fuses. Requirements for approval for use in gassy and dusty mines, including provision of explosion proof casing, clearance of live parts, interlocking of fuses and switches, construction of inclosure, thickness of walls, design of joints in casing, conductor entrances, explosion tests, etc.

U. S. Gov., Federal Specifications Board. 56; 1923. Nonrefillable Cartridge Fuses. Requirements on styles of terminals for various voltage and current ratings, construction, materials, dimensions, rating test, temperature test, and short circuit test.

U. S. Gov., Federal Specifications Board. W–F–801; 1931. Renewable Inclosed Cartridge Fuses. Covers unpacked and powder packed types, ordinary and increased time-lag types, ferrule and knife blade types for 250 and 600 volts. Requirements on dimensions, ratings, temperature, rating, and short-circuit tests.

U. S. Gov., Federal Specifications Board 346; 1925. Nonrenewable Plug Fuses. Requirements on general structural features, test for carrying 110 per cent rated current, time to blow, temperature rise, and short circuit test, using test methods of Underwriters' Laboratories.

References.—Fuse blocks, cut-out bases. *See also* 714.22. Definitions, symbols, service standards, safety codes. *See also* 710.

714.22 Fuse Blocks, Cut-out Bases, and Clips

American Railway Assn. Mechanical Div. Recommended Practice. Car Lighting; 1927. Includes link fuse holder for use in battery fuse boxes and on regulator panels of railway cars, recommended dimensions and design for one standard size.

American Railway Assn. Telegraph and Telephone Section. 2–G–5; 1924 and 2–G–6; 1924. Fuse Block ARA–1–A and ARA–2–A. Base of porcelain, general quality and absorption test requirements, clips of german silver, thickness, hardness, and chemical composition requirements, composition of insulating filler, detail dimensions of 6-fuse and of 10-fuse fuse blocks.

Assn. of Electragists, International. Electragist Standards for Wiring Installations; 1928. Includes cut-out bases, requirements for buses, protective devices, barriers, circuit numbering, suitable materials for base.

Assn. of Railway Electrical Engineers 1929 Manual. Electric Train Lighting; 1928. Includes fuse clips for knife fuses and fuse holders for open end link fuses, design and overall dimensions for 60 to 200 amperes at 250 volts for use on panels or in battery boxes.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Cut-out Bases. Capacity limits, spacing of metal parts, break distance for link fuse, for mountings on slate, marble or composition bases, classification of plug and cartridge cut-outs according to voltage and current capacity.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 226 Cartridge Inclosed Fuse Standards. Includes cutout bases for inclosed cartridge, plug, and link fuses, requirements on properties of insulating bases, number of supporting screws, leakage distances, materials for metal parts, thickness of metal, dimensions, and spacing of contact parts, standard ratings, dimensions of studs and soldering lugs, form and dimensions of Edison screw shell.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 232–415. Knife and Inclosed Switch. Covers cutout bases for use with knife and inclosed switches, requirements on properties of insulating base material, structural features, standard ratings, dimensions, thicknesses of metal, and spacing of contact parts for cartridge, link, and plug fuses, form and dimensions of Edison type screw shells.

Society of Automotive Engineers 1931 Handbook. Fuses and Fuse Clips; 1926. For circuits up to 40 volts and 30 amperes, dimensions of cartridge type fuses and fuse clips, requirements as to marking, continuous current capacity and temperature rise when carrying rated current.

Underwriters' Laboratories. Cutout Bases; 1927. Insulating base for fuse, not including car-lighting cut-outs. For bases of slate, marble, or porcelain, or other acceptable insulation, detail requirements on screw holes, mounting, threaded parts, contact clips, sealing, carrying capacity of metal parts, spacing of metal parts and break distances for link fuse bases, dimensions of standard cut-out bases for plug fuses, and for ferrule contact and knife blade contact cartridge fuses.

U. S. Gov., Federal Specifications Board 55; 1923. Cut-out Bases. Requirements on general qualities for marble, slate, or porcelain insulating materials, thickness, spacing, and dimensions of terminals and contact clips, ampere and voltage classification, for ferrule, knife blade, and screw shell contacts.

References.—Slate for electrical purposes. *See also* 511.53. Porcelain insulation for fuse blocks. *See also* 532.22. Definitions, symbols, basis of rating, methods of testing, service standards, safety codes. *See also* 710. Terminal blocks. *See also* 715.39.

714.3 INSTRUMENTS AND METERS, ELECTRICAL

714.30 General Items

American Institute of Electrical Engineers. Standard No. 33; 1927. Electrical Measuring Instruments. Definitions of instruments and parts, classification, heating limitations and measurement, dielectric test and insulation resistance, construction. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Railway Assn. Signal Section 10720; 1921. Switchboard. Includes electrical measuring instruments, indicating device to be damped, permissible error in reading when used with instrument transformers and when used without.

U. S. Gov., Dept. of Commerce, Bureau of Mines Schedule 2C; 1930. Explosion Proof Mine Equipment. Meters. Requirements for approval for use in gassy and dusty mines, including provision of explosion proof casing, thickness of casing walls and of meter glass, protection for glass, entrance of leads, explosion tests, etc.

References.—Automobile instrument mountings. *See* 722.32. Measurement of temperature coefficient of resistance of manganin and constantan wire. *See* 715.43.

714.31 Ammeters

American Railway Assn. Signal Section 11221; 1921. Portable a. c. Ammeters. Divided into 2 classes according to accuracy and 7 ranges, ranges, scales and resistances, general structural requirements, heating and permissible error due to heating, impedance limits and accuracy requirements, dielectric test requirements.

References.—Voltammeter. *See* 714.32. Definitions, symbols, classification, test requirements, construction, error, safety codes. *See* 714.30, 710. Meter binding posts. *See also* 714.37. Copper wire. *See* 715.44.

714.32 Voltammeters

American Railway Assn. Signal Sectiton 8519; 1920. Portable Direct Current Volt-Ammeters. For railway signal testing, d'Arsonval type, 100 ohms per volt and 50 ohms per volt classes, voltage and current ranges, size and division of scales, structure of pointer, mirror slot, provision of jewel bearings, magnetic shielding, etc., requirements on sensitivity, temperature error, and accuracy.

References.—*See* references under 714.31.

714.33 Voltmeters

American Railway Assn. Signal Section 11528; 1928. Voltmeter. Alternating current voltmeter for signal testing, ranges and scales, portable type, type of pointer, jewel bearings, case, etc., requirements on heating, sensitivity, and accuracy.

References.—*See* references under 714.31.

714.34 Watthour Meters

Assn. of Edison Illuminating Companies. Joint sponsor with National Electric Light Assn. and Nat. Bureau of Standards. Approved by American Standards Assn. as C 12–1928. Code for Electricity Meters. Includes d. c. watthour meters, requirements on design and construction, preliminary procedure and test methods, rules for acceptance, allowable deviations in registration, on initial test, on variation of voltage and temperature, on application of external field, on temporary overloads; allowable watt loss in current circuits, installation methods.

Assn. of Edison Illuminating Companies. Joint sponsor with National Electric Light Assn. and Nat. Bureau of Standards. Approved by American Standards Assn. as C 12–1928. Code for Electricity Meters. Includes polyphase watthour meters, requirements on design and construction, preliminary procedure and conditions of test, test methods, rules for acceptance, tests for independence and equality of winding elements, allowable deviation in registration, on initial performance, on variation of power factor, voltage, frequency, temperature, on application of external field, on temporary overloads, allowable watt loss in current circuits, installation methods.

Assn. of Edison Illuminating Companies. Joint sponsor with National Electric Light Assn. and Nat. Bureau of Standards. Approved by American Standards Assn. as C 12–1928. Code for Electricity Meters. Includes single-phase watthour meters, requirements on design and construction, preliminary procedure, methods of test, rules for acceptance, allowable deviations in registration, on initial test, on variation of power factor, voltage, frequency, on application of external field, on variation in temperature, on temporary overloads; allowable watt loss in current circuits, installation methods.

National Electric Light Assn. Suggested Standard. Publ. 278–16; 1927. Standardization of Terminal Chambers for Single Phase and Polyphase Watthour Meters. Dimensions of end wall opening for single phase meters, outside dimensions of standard terminal chamber for bottom connected type polyphase watthour meters, sequence of current terminals for bottom connected meters, location of mounting holes. Published in 1924 N. E. L. A. proceedings.

References.—Demand wattmeters. *See* 714.38. Definitions, classification, symbols, construction, error, safety codes, standard voltages and frequencies. *See also* 714.30, 710. Meter cabinets. *See also* 715.12. Copper wire. *See* 715.44.

714.35 Wave Meters

References.—Radio-frequency meters. *See* 718.65.

714.36 Wheatstone Bridge

714.37 Electrical Meter Parts

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Electrical Instrument Binding Posts; 1927. For two ranges of current capacity, size of binding post and thread pitch.

714.38 Demand Wattmeters

Assn. of Edison Illuminating Companies. Joint sponsor with National Electric Light Assn. and Nat. Bureau of Standards. Approved by American Standards Assn. as C 12–1928. Code for Electricity Meters. Includes curve drawing demand meters, d. c. and a. c., requirements on design and construction, preliminary procedure and methods of test, rules for acceptance, allowable deviation in indications for variation in voltage, power factor, frequency, and temperature, requirements on damping, sensitivity, timing and legibility of record.

Assn. of Edison Illuminating Companies. Joint sponsor with National Electric Light Assn. and Nat. Bureau of Standards. Approved by American Standards Assn. as C 12–1928. Code for Electricity Meters. Includes integrated-demand meters, requirements on design and construction, preliminary procedure and methods of test, rules for acceptance, tests for acceptability of measuring portion, requirements on legibility of record and equality of energy intervals, accuracy requirements of demand intervals, of contact mechanism, of registering mechanism, of clock or timing motors, installation methods.

Assn. of Edison Illuminating Companies. Joint sponsor with National Electric Light Assn. and Nat. Bureau of Standards. Approved by American Standards Assn. as C 12–1928. Code for Electricity Meters. Includes lagged-demand meters, requirements on design and construction, preliminary procedure and methods of test, rules for acceptance, tests for accuracy of indication, requirements on equality of winding elements, allowable deviations in indications for variation in voltage, power factor, frequency and temperature, methods of installation.

References.—Watthour meters. *See* 714.34. Definitions, classification, symbols, test requirements, construction, error, safety codes, standard voltages and frequencies. *See also* 714.30, 710. Copper wire. *See* 715.44.

714.39 Miscellaneous Electrical Measuring Instruments

U. S. Gov., Dept. of Commerce, Bureau of Standards S 285; 1916. Summary of Experiments on the Silver Voltameter and Proposed Specifications. Recommendations on preparation and purity of electrolyte, on size of cathode chamber, on type and material of cathode and anode.

714.4 PANELS, PANEL BOARDS, SWITCHBOARDS

714.41 Panels and Panel Boards

Assn. of Electragists, International. Electragist Standards for Wiring Installations; 1928. Includes panelboards for lighting or power distribution, requirements for bases, buses, protective devices, switches, barriers, and circuit numbering.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn. C1–1931. Panel Boards. Location, clearances, accessibility, grounding requirements, construction of non combustible materials, arrangement of switches and fuses, distances between live parts.

National Electrical Manufacturers Assn. Publ. No. 31–4; 1931. Panel Board and Distribution Board Standards. Rule PB4–10. Standards on Design and Construction of Panel Boards. Requirements on motion of switch blades and handles, permissible loads on branch panel boards, fuse arrangement and connection of neutral, general properties and minimum thickness of base, mounting and spacing of buses, fuses, and switches, dimensions of fuse clips and plug fuse terminals, construction, current carrying capacity, and contact area of buses, switch capacities, structural features of panelboard, temperature rise and insulation resistance requirements.

Underwriters' Laboratories. Panel Boards; 1931. Permissible arrangement and operation of main and branch switches and fuses, thickness, material, and design of insulating base, methods of mounting apparatus, spacing of current carrying parts and clearances from metal walls, dimensions of fuse holder terminals, allowable current carrying capacities, design of terminals, connections, insulation resistance requirements.

U. S. Gov., Dept. of Commerce, Bureau of Standards H7; 1926. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the Installation and Maintenance of Electric Utilization Equipment. For panel boards, requirements on method of connecting in plug-fuse shells on panels without switches, properties of the insulating board.

References.—Telephone jack panel. *See* 718.22. Slate for electrical purposes. *See also* 511.53. Cabinets for panel boards. *See* 715.12. Wiring practice. *See also* 715.30. Definitions, symbols, standard voltages, service standards, safety codes, methods of test. *See also* 710. Switchboards. *See also* 714.42.

714.42 Switchboards

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Switchboards. For impregnated asbestos lumber or slate panels for lower voltages, permissible size and minimum thickness, required equipment on auxiliary generator switchboards, permissible temperature rises for switches, circuit-breakers, bus bar contacts, etc., dielectric strength test for switching and control apparatus.

American Institute of Electrical Engineers. Standard No. 27; 1930. Switchboard and Switching Equipment for Power and Light. Definitions of classes of switchboards and types of switching equipment, rating definitions, permissible temperature rise for panels and panel supports.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Switchboards. Recommendations on installation, material and freedom from metallic veins for panels, maximum size of panels and minimum thickness of slate panels, construction of metal frame work, equipment to be provided on generator switchboard and on distribution switchboard.

American Railway Assn. Signal Section 6217; 1917. Switchboard Material. Covers practically the same ground as requisition 10720 for switchboard for a. c. signal system, except that 6217 contains more standard section dimensions and requirements for beveling and drilling for supports, and length of pipe supports, and requirements for reverse current air circuit breakers.

American Railway Assn. Signal Section 10720; 1921. Switchboard. For alternating current signal system, general quality and dimensions of slate panels, pipe or angle iron supports, dielectric strength requirements according to rules of Am. Inst. of Elec. Engrs., general design requirements for instruments, instrument transformers, fuses, switches, circuit breakers, disconnecting switches.

American Railway Assn. Signal Section. Installation and Operation of Switchboard; 1928. To comply with Nat. Bd. of Fire Underwriters, foundation, assembly, recommended clearances, insulation, wiring, grounding, compartment construction, operating instructions as regards safety, putting board into operation, operation of switches, etc.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Bridges; 1922. Includes slate panel switchboard, thickness and general quality, meter and switch equipment to be provided, general design and operating requirements for circuit breakers, knife switches, magnetic switches, shunt coils, metal covers, wiring.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Switchboards and Panel Boards. Of noncombustible material, location, clearances, accessibility, grounding requirements, insulation of wires, overload protection and grounding requirements for instruments.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 124–400. Safety Inclosed Switchboards, Removable Truck Type. Standard voltage ratings, minimum thickness allowance on sheet steel panels and on sheet steel covering or housing, standard switchboard sizes, requirements on provision of automatic disconnection of wiring, location of buses, provision of barriers, insulation, truck and housing interlocks.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 124–500. Automatic Switching Equipment. Requirement on standard sizes and bevel for slate panels, standard device numbers for use on wiring diagrams of machine automatic switching equipments.

National Electrical Manufacturers Assn. Publ. No. 31–4; 1931. Panelboard and Distribution Board Standards. Rule PB5–10. Standards on Design and Construction of Switchboards. Requirements on material, thickness, standard sizes and finish of slate panels, sizes of pipe and angle iron framework, size of sill, minimum size and insulation of small wiring, ratings and application of buses.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. Installation, Operation and Care of Power Switchboards; 1931. Instructions on erection of panels, recommendations on construction of concrete and brick structures, quality and size of aggregates, mix proportion of concrete and mortar, construction of connections, calculation of stresses in bar supports due to short circuits.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. Power Switchboards; 1930. Standard ratings of buses, standard sizes and dimensions of slate and of steel panels, standard sizes of metal frames and sills, small wiring practice, rules on application of ground detectors, switching devices, field switches, instruments, etc.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. Safety Inclosed Switchboards. For removable truck type, rating standards, standard sizes and thickness of steel panels, thickness of metal and depth of housing, requirements on bus location, provision of barriers, grounding device, interlocking of truck and housing, etc.

Underwriters' Laboratories. Electric Lighting Plants; 1921. Includes switchboards for isolated plants, spacing of wiring, insulation resistance, and dielectric strength requirements.

U. S. Gov., Dept. of Commerce. Bureau of Standards H7; 1926. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the Installation and Maintenance of Electric Utilization Equipment. For switchboards accessible to other than qualified electrical operators, requirements on grounding, inclosure of current carrying parts, means of disconnecting fuses, etc.

References.—Controllers, resistors, fuses. *See also* 714.11, 714.12, 714.2. Instruments, instrument transformers. *See also* 714.3, 713.5. Circuit breakers, switches. *See also* 714.51, 714.52. Telephone panels. *See* 718.22. Slate for electrical purposes. *See also* 511.53. Steel plates and sheets. *See also* 604.1, 604.2. Copper wire. *See also* 715.44. Definitions, symbols, standard voltages, methods of test, service standards, safety codes. *See also* 710. Relays. *See also* 714.14.

714.5 SWITCHES AND CIRCUIT BREAKERS

714.50 General Items

National Electrical Light Assn. Publ. No. 149; 1931. Suggested Guide for Specification Covering Metal Clad Switch Gear. For 5 standard units of bus, circuit breaker, cable terminal chamber, current and potential transformers, requirements for tests in accordance with A. I. E. E. rules, insulation provisions, accessibility and removability of parts, types and operating features of interlocks, etc.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. Automatic Switchgear; 1931. Rating standards of circuit breakers, use of device function numbers, list of standard device function numbers for machine equipments and their corresponding functions.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. Installation, Operation and Care of Power Switching Equipment and High Voltage Fuses. 1931. Instructions on erection, installation of conductors, construction of mounting structure, weatherproofing, etc.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. Metal Clad Switchgear; 1931. Standard voltage ratings, temperature rises in accordance with A. I. E. E. standards, standard current ratings of bus structure, requirements on grounding, interlocks and locking, small wiring connections, standard bus and connection arrangements.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. Power Switching Equipment; 1931. Basis of ratings, standard current ratings for outdoor disconnecting switches, standard voltage ratings of disconnecting and horn gap switches, short time ratings, standard control voltages flashover values and dimensions of insulators, phase spacing of switches, steel specifications for outdoor substations, current ratings for bare solid wire, cable, and copper tubing used as conductors, standard current and voltage ratings for fuse cutouts.

714.51 Circuit Breakers

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Circuit Breakers. Requirements on range of adjustment, vibration and inclination-proof characteristics of tripping devices, dielectric strength test, permissible temperature rise of various parts at rated current.

American Institute of Electrical Engineers. Standard No. 19; 1925. Oil Circuit Breakers. Definitions, rating, heating limits and measurement, dielectric test. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 20; 1930. Air Circuit Breakers. For indoor alternating current and direct current air circuit breakers exclusive of inclosed types, definitions including rating definitions, permissible temperature rise and methods of measurement, dielectric test requirements.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Circuit Breakers. Recommendations on circuit opening capacity, range of adjustment, temperature rise for current carrying parts at rated load, general construction of contacts, proof against vibration, and operation at an inclination of 30°, conforming to Nat. Electric Code.

American Railway Assn. Signal Section 6217; 1917. Switchboard Material. Includes air circuit breakers of carbon break type for overload and reverse current, provision for calibrated tripping device, permissible temperature rise, percentage of reverse current and limits on operating voltage for reverse current breakers.

American Railway Assn. Signal Section 10720; 1921. Switchboard. For a. c. signal system. Includes circuit breakers, permissible temperature rises for contacts and coils for various conditions of location in air or immersed in oil and for various types of insulation, requirements as to range in voltage for operation of remote controlled breakers, some general design and current rupturing test requirements.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Circuit Breakers. General structural and trip device requirements, location, approved applications, and current setting requirements, fuse and circuit breaker capacity requirements for lighting and appliance branch circuits and for motor circuits.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 124–700. Oil Circuit Breakers. Standard ampere ratings based on tests of Am. Inst. of Elec. Engrs., standard voltage and frequency ratings, requirements for determining interrupting capacity rating, standard tripping voltages for manually operated circuit breakers, rating limits on panel mounting breakers.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 212. Air Circuit Breaker. Requirements on rating limits for front connected breakers and for round stud and laminated stud rear connected breakers, standard control voltages and range, dimensions of studs, dimensions of soldering lugs, standard ampere ratings of breaker.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. Installation, Operation and Care of Large Air Circuit Breakers; 1931. Instructions on installation, making of connections, maintenance rules for dash-pots, tripping coils, resistors, etc.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. Installation, Operation and Care of Oil Circuit Breakers; 1931. Instructions on mounting, sampling, testing, and drying of oil, filling tanks, making of connections, control wiring, etc.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. Large Air Circuit Breakers; 1931. Standard ampere ratings, basis of ampere rating and of interrupting capacity, short time ratings, standard operating duty, calibration range, standard control voltages and range, dimensions of round and laminated studs.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. Oil Circuit Breakers. 1931. Standard ampere and voltage ratings, ratings based on A. I. E. E. rules, interrupting capacity ratings, standard steps of interrupting capacity and ampere rating for outdoor circuit breakers, short time ratings, control voltage standards, tripping voltages for manually operated circuit breakers, standard ratings and arrangement of bushing type current transformers, standard sizes of drain valves for tanks.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Breaker Contacts; 1922. Size of threads and dimensions of hexagon head and lock nuts.

Underwriters' Laboratories. Circuit Breakers, Air Break Type; 1920. For 600 volts or less, supporting and material requirements of base, minimum spacing of live parts from supporting screws, method of mounting, current-carrying capacity, closeness of calibration, and general construction, test requirements for current breaking capacity and high voltage.

Underwriters' Laboratories. Service Entrance and Branch Circuit Circuit-Breakers; 1928. Inclosure requirements, materials and mounting of insulating base and current carrying parts, operating requirements, spacing of live parts, rating, test requirements for overload, endurance, calibration, breaking capacity, and dielectric strength.

References.—Oil for oil circuit breakers. *See* 504.8. Definitions, symbols, rating basis, standard voltages, methods of test, installation, service standards, safety codes. *See also* 710. Circuit breakers in conjunction with controllers. *See also* 714.11. Power switching and automatic switchgear equipment, metal clad switchgear. *See also* 714.50.

714.52 Switches

American Institute of Electrical Engineers. Standard No. 16; 1925. Railway Control and Mine Locomotive Control Apparatus. Includes switches, definitions and classification, rating, heating limits and measurement, range of operation, dielectric test. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 22; 1925. Disconnecting and Horn Gap Switches. Definitions, rating, heating limits and measurement, dielectric tests. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 27; 1930. Switchboard and Switching Equipment for Power and Light. Includes definitions of types and parts of switching equipment, rating definitions.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Switches. For watertight and nonwatertight types, recommended requirements on area of contact surfaces, provision of soldering lugs, meeting requirements of Underwriters Laboratories, clearance in box and leakage test for watertight switches.

American Railway Assn. Signal Section 10720; 1921. Switchboard. Includes disconnecting switches, of knife type with provision for operation by rod, material of base and type of mounting for various voltages, permissible temperature rise at rated current carrying capacity.

American Railway Assn. Signal Section 10720; 1921. Switchboard. Includes knife switches, of cold-rolled copper, requirements on conductivity, permissible temperature rise at contacts or other parts when carrying rated current, type of handle on multiple pole switch.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Includes knife switches, maximum current density, minimum capacity, minimum thickness of blades, current density at contact areas.

American Railway Engineering Assn. 1929 Manual. Iron and Steel Structures. Movable Railway Bridges; 1922. Includes magnetic switches for switchboards, a few operating and constructional requirements, provision of magnetic blowouts for direct current switches, shunt coil insulation to withstand induced voltage kick.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Switches. Open knife switches, spacing of parts and break distances for switches up to 600 volts, installation, mounting positions, method of connection, and operation requirements. Snap switches, material of subbase, clearance of wires.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 124–900. Disconnecting Switches, Horn Gap Switches, Choke Coils, Bus Supports, Fuse Mountings for 2,500 Volts and Above. Standard ampere, voltage, and frequency ratings, to meet tests of Am. Inst. of Elec. Engrs.; short time rating definition, standard color of porcelain insulators, standard stud shapes for rear connected switch.

National Electrical Manufacturers Assn. Handbook of Supply Standards 1927; No. 232–320. Exposed Type Front Connected and Rear Connected Knife Switches. Requirements on properties and minimum thickness of insulating base, construction, permissible temperature rise at rated current, minimum dimensions of blades and jaws, hinge and terminal construction, standard ratings, spacing of switch and fuse parts.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 232–415. Knife and Inclosed Switch. Requirements on size of knockout openings for inclosed switches, construction, ratings, spacing, and dimensions of parts of cutout bases, dimensions of rear connected studs, dimensions of soldering lugs.

Underwriters' Laboratories. Inclosed Switches; 1930. Covers air-break switches having current carrying parts inclosed in metal cases with external operating handles. Thickness of metal, tightness, joint structure, reinforcement, length of threads, spacing of hinges, and general construction of inclosing cases and doors; for switches, material of base, construction details of switch, operating temperature rise, minimum dimensions of parts of knife-blade switches; for fuse cutout bases, minimum dimensions and spacings; for operating mechanism, general construction; spacing requirements between live parts and inclosure walls, provisions for grounding, test requirements for heating, overload, endurance, and dielectric strength, for switch operating in inclosure.

Underwriters' Laboratories. Knife Switches; 1923. Thickness of insulating base, mounting requirements, thread engagement, construction, materials and minimum dimensions of blades, break and hinge jaws, and cross bar, standard spacing of parts, repeated operation test at overload, temperature rise at rated current and dielectric strength test requirements.

U. S. Gov., Dept. of Commerce, Bureau of Mines Schedule 2C; 1930. Explosion Proof Mine Equipment. Switches. Requirements for approval for use in gassy or dusty mines, including provision of explosion proof inclosure, interlocking of fuses and switch, construction of inclosures, inclosure joints, inspection openings and covers, lead entrances, etc., explosion test of inclosure.

U. S. Gov., Dept. of Commerce, Bureau of Mines Schedule 4A; 1922. Procedure for Establishing a List of Permissible Electric Switches and Junction Boxes for Use at the Outer End of Trailing Cables. Requirements on ruggedness of construction, protection of contacts and terminals, tightness of joints, interlocking of switch mechanism and fuses with cover outside operating handle, etc., test requirements for operation of devices in explosive gas mixtures, scope of bureau's approval, fees.

U. S. Gov., Dept. of Commerce, Bureau of Standards H7; 1926. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the Installation and Maintenance of Electric Utilization Equipment. For inclosed air-break switches (not including snap switches), requirements on provision of locks for locking in "off" position, marking, grounding, thickness of metal of inclosure, provision for automatic disconnection of fuses, etc.

U. S. Gov., Federal Specifications Board 175; 1924. Knife Switches. Requirements on properties and thickness of insulating base, mounting, threading, and fit of parts, minimum dimensions of blades and jaws, material of cross bars, overload operation test, temperature rise test, and high voltage test, standard spacing of parts.

References.—Lighting snap switches. *See also* 715.22. Magnetic switches, knife switches, and contactors in conjunction with controllers. *See also* 714.11. Switch boxes and inclosures. *See also* 715.12. Slate for electrical purposes. *See also* 511.53. Porcelain for electrical purposes. *See also* 532.22. Definitions, symbols, rating basis, standard voltages, methods of test, service standards, safety codes. *See also* 710. Power switching and automatic switchgear equipment, metal clad switchgear. *See also* 714.50.

715. TRANSMISSION AND DISTRIBUTION APPARATUS

715.1 CONDUITS AND SWITCHBOXES

715.11 Electric Conduit, Wire Raceways, and Fittings

American Electric Railway Engr. Assn. D200–29; 1929. Specification and Form of Contract for Electrical Conduit Construction. Includes tile duct and fiber duct. For tile duct, single, requirements on length, minimum bore and thickness of walls, structural features, glazing, alignment, permissible cracks and blisters, absorption test. For fiber duct, requirements on saturation, heat test, standard sizes, length, trueness of bore, thickness, type of joint.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practice for Electrical Installations on Shipboard. Conduit Terminal and Bulkhead Stuffing Tubes. For bronze, brass, or galvanized malleable iron, recommended requirements on general construction, threading, design and application of stuffing and terminal tubes.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practice for Electrical Installation on Shipboard. Conduit. Recommendations on zinc treating of steel conduit, flake test for paint, steel conduit to meet requirements of Underwriters Laboratories. For brass conduit, recommended seamless construction with dimensions the same as for steel conduit.

American Railway Assn. Electrical Section. XVIII–a–21; 1921. Underground Conduit Construction for Power Cables. Fiber Conduit. For wood pulp or fiber conduit impregnated with bituminous insulating compound, requirements on solidity of impregnating compound, resistance to acids, alkalies, and moisture, unit length, tolerances on dimensions, standard thicknesses, mandrel test, joint construction for socket, drive, and screw joints, dimensions of joint sleeves, deflection test, compression test, and water-absorption test, method of installation.

American Railway Assn. Electrical Section. XVIII–a–21; 1921. Underground Conduit Construction for Power Cables. Vitrified Clay Ducts. Requirements on general quality and construction, permissible defects, standard length, tolerance on inside dimensions, minimum wall thickness, mandrel test, water-absorption test, freedom from alkalies and acids, installation rules.

American Railway Assn. Electrical Section. XVIII-b-21; 1921. Stone Conduits. Requirements on screen grading of limestone screenings, mix proportions with Portland cement, standard dimensions, joint construction, mandrel test, water absorption test, hammer test for cracks, installation rules.

American Railway Assn. Signal Section 2412; 1912. Vitrified Clay Conduit. Covers sewer pipe style round or square bore and multiple duct square bore conduit for wires and cables, dimensions, general quality and permissible size of defects, finish, test requirements for straightness, alkalinity, and water absorption.

American Railway Assn. Signal Section 3613; 1913. Steel Pipe Conduit. General quality of soft steel conduit, dimensions according to Briggs standard for pipe, dimensions of bends, coating requirements and permissible types, tension, hydrostatic pressure, and flattening test requirements, bending and acid test for enamel, test of zinc coatings by reference to A. R. A. specifications.

American Railway Assn. Signal Section 3713; 1913. Wrought Iron Pipe Conduit. General quality, dimensions according to Briggs standard for pipe, dimensions of bends, coating requirements and permissible types, tension, hydrostatic pressure, and flattening test requirements, bending and acid test for enamel, test of zinc coatings indicated by reference to A. R. A. specifications.

American Railway Assn. Signal Section 5728; 1928. Trunking and Capping. Wood trunking as conduit for insulated wire, finish, dimensions, quality requirements for lumber, permissible defects in white or Norway pine, longleaf yellow pine, fir, cedar, cypress, and redwood.

American Railway Assn. Signal Section 6418; 1918. Impregnated Fiber Conduit for the Protection of Insulated Wires and Cables. Made of wood pulp or fiber impregnated with bituminous insulating compound, dimensions of conduit, joints, and fittings, acid test, heat test, insulation test of wetted sample, deflection test, crushing test and moisture absorption test requirements.

American Railway Assn. Signal Section 12429; 1929. Concrete Trunking and Capping. For protection of insulated signal wire, size and type of reinforcement steel, cement according to A. R. A. specifications, permissible clay in sand, size of stone or gravel, mixing proportions, placing concrete, dimensions of forms, curing.

American Railway Assn. Telegraph and Telephone Section. 1–C–3; 1928. Creosoted Wood Conduit. For conduit of southern yellow pine, Norway pine, or black gum, permissible defects in wood, range in lengths of one size square conduit with circular bore, dimensions of tenons and mortises, required weight of preservative, method of creosoting according to A. R. A. specification 1–A–10.

American Railway Assn. Telegraph and Telephone Section. 1–C–4; 1928. Creosoted Pine Plank. Plank for use in underground construction, southern yellow pine, permissible defects, dimension requirements, method of creosoting and creosote according to A. R. A. specifications.

Assn. of Electragists, International. Electragist Standards for Wiring Installations; 1928. Includes electrical metallic tubing, installation requirements, ends and joints, supports, protection and grounding.

Assn. of Electragists, International. Electragist Standards for Wiring Installations; 1928. Includes flexible metal conduit, installation requirements, joints, number and kinds of supports, protection, number of bends, continuity, grounding, use in wet places.

Association of Electragists, International. Electragist Standards for Wiring Installations; 1928. Includes rigid metal conduit, installation requirements, construction of joints, number of supports, number of bends, continuity, grounding. Material requirements, diameters, wall thicknesses, lengths, threads, dimensions of elbows, some requirements are in addition to those of Underwriters Laboratories standards.

Assn. of Electragists, International. Electragist Standards for Wiring Installations; 1928. Includes surface metal raceways, requirements on installation, bends, supports, protection, grounding.

National Electric Light Assn. Suggested Specifications D180–24T; 1924. Ground Wire Molding (Material). D190–24T; 1924. Ground Wire Molding (Dimensions). For wood molding of oak, chestnut, or rock elm, permissible amount of defects, dimensions and allowable variations. Published in 1924 N. E. L. A. proceedings.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 238–215. Metal Moulding. Covers metal raceways of mild sheet steel for surface wiring, requirements on design, securing features, wire capacity, thickness of metal, electrical continuity, test requirements for quality of zinc or enamel coatings.

Society of Automotive Engineers 1931 Handbook. Flexible Conduit Ferrules; 1928. Dimensions of ferrules or bushings for various sizes of conduit, made of soft sheet brass or soft sheet steel, salt spray test requirements for zinc or cadmium plated steel ferrules.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Flexible Steel Conduit and Tubing; 1926. Includes conduit for protection of electrical wiring, of square locked type, requirements on construction, rust proof coating, dimensions, tension test, breaking test, and corrosion test.

Underwriters' Laboratories. Flexible Metallic Conduit; 1920. For use as a raceway for installation of electric wires for circuits under 550 volts, requirements for interior surfaces, internal diameter, thickness of strips used, weight of conduit, test requirements for zinc coating, tension, and flexibility.

Underwriters' Laboratories. Metal Raceways for Surface Wiring; 1925. Constructed of mild sheet iron or sheet steel of one or two pieces, design, method of and frequency of attachment and fastening of capping, limiting dimensions, thickness of metal, test requirements for zinc and enamel protective coatings.

Underwriters' Laboratories. Rigid Steel Conduit; 1931. Requirements on application of protective coatings, bend tests of sheet samples and of coated conduit for testing elasticity of enamel coatings, bend tests of zinc coated conduit for testing elasticity of zinc coatings, copper sulphate test for adequacy of zinc coating, threading and reaming, standard lengths and weights, radii of elbows, and weights of nipples.

Underwriters' Laboratories. Wooden Raceways for Surface Wiring; 1920. For electric circuits of 300 volts or less, for use in dry places, design, minimum thicknesses of walls, and finish requirements.

U. S. Gov., Federal Specifications Board 311; 1925. Rigid Conduit, Enameled. For mild steel tube, preparation of surfaces, general quality requirements for enamel coating, flake test requirements, dimensions and length of threads, minimum weights of 10-foot lengths.

References.—Nonmetallic flexible conduit. *See* 715.13. Methods of testing and general requirements for metals. *See also* 600.1. Zinc coatings. *See also* 600.3. Standard pipe sizes and threading. *See also* 607.0. Other wrought iron and steel pipe. *See* 607.3, 607.4. Lumber grading rules. *See also* 400.2, 400.3. Wood preservation, preservatives. *See also* 400.42, 801.3. Cement, gravel and sand. *See also* 516.1, 512.1. Reinforcing steel. *See also* 605.25. Clay sewer pipe, methods of testing clay products. *See also* 531.5, 531.0. Sheet steel. *See also* 604.22, 604.23.

715.12 Switch Boxes, Outlet and Junction Boxes, Cabinets

American Electric Railway Engr. Assn. Recommended Specification D102–29; 1929. Overhead Line Material for Direct and Catenary Suspension. Includes wooden switch boxes, general requirements on construction, painting, inclination of lead entrance holes, guarding of switch handle.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practice for Electrical Installations on Shipboard. Connection Boxes. Boxes for interior communication circuits, recommended watertight construction of noncorrodible material, test for watertightness, thickness of walls and cover, provision of terminal tubes.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Feeder, Junction, and Branch Boxes. For cast-brass, cast-bronze, cast-iron, or galvanized welded sheet steel boxes, recommended requirements on thickness of walls, cover, and mounting bosses, conduit connections, sizes and material of screws, gaskets for watertight construction.

American Railway Assn. Telegraph and Telephone Section. 2–G–21; 1926. Metal Boxes. Boxes for use as panel, terminal, and resistance cabinets, hinged cover type and lift off cover type, dimensions and construction of boxes, thickness of sheet steel, sizes of hinges and handles.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Boxes, Cabinets and Outlet and Terminal Fittings. Requirements for protective coatings, minimum thickness of metal on small boxes, construction and required clearances of current carrying parts for cabinets and cutout boxes of metal or lined wood, minimum depth of outlet boxes, installation requirements of boxes, cabinets, outlet and terminal fittings.

National Electric Light Assn. Publ. 289–39; 1929. Suggested Specifications for Service Entrance Meter Cabinets. For cabinets with accessible fuses and for cabinets with fuses under seal, for meter terminal chamber extending into cabinet and for meter chamber abutting cabinet, dimensions of standard openings for abutting type and of adapter openings for other type, requirements on installation of fuses, circuit breakers, and switches.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 246–215. Outlet Box. Includes Switch Box, recommended practice for 4 standard units of flush mounting boxes with adjusting ears, for nonmetallic flexible conduit, armored cable and ½-inch conduit, design, standard dimensions, threading of switch attachment lugs, size of knockouts, etc.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 246–230. Outlet Box. Covers 3 and 4 inch diameter outlet boxes of square, octagonal, and round shape, extension rings and covers, dimensions, type of protective coating, size of knockouts, spacing of mounting and cover attachment holes requirements.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 248–230. Overhead Trolley Line Materials. Switch Boxes. General design for wooden box, illustrated.

National Electrical Manufacturers Assn. Publ. No. 31–4; 1931. Panelboard and Distribution Board Standards. Rule PB6–10. Design and Construction of Cabinets and Equipment Boxes. Requirements on construction and reinforcement of sheet metal boxes, sizes of wiring spaces, thickness of barriers, spacing from live parts, minimum depths of cabinets, thickness of cast and sheet metal for bodies, frames, and doors, assembly methods, hardware types and attachment features, finish, sizes of knockouts.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 250–705. Standard Sizes of Knockout Openings. Minimum diameter of circular opening for conduit up to 3-inch, for loom knockouts, and for cable knockouts.

Underwriters' Laboratories. Cabinets and Cutout Boxes; 1929. Requirements on size and arrangement of wiring space and inclosing barriers for various capacity mains, spacings required between mountings, current carrying parts, and walls of cabinets, minimum thicknesses of cast iron or sheet steel for walls and doors, construction of boxes, type and mounting of doors, hinges, and latches.

Underwriters' Laboratories. Outlet Boxes; 1928. Approved by American Standards Assn. as C33a–1929. Covers outlet boxes, armored cable boxes, concrete boxes, conduit boxes, flexible nonmetallic tubing boxes, flush device boxes, junction boxes, nonmetallic sheathed cable boxes, pull boxes, extension rings and covers. Requirements on minimum thickness of sheet or cast metal, coating of metal, supports and mounting, conduit connection, strength, design, thicknesses of clamps and fasteners, strength and twist tests of fixture studs.

U. S. Gov., Dept. of Commerce, Bureau of Mines. Schedule 2C; 1930. Explosion Proof Mine Equipment. Junction Boxes. Requirements for approval for use in gassy and dusty mines, including requirements on thickness of walls, construction of joints and bolting, conductor entrance construction, provision of interlocked plug for trailing cable, explosion tests, ability safely to open circuit under load, recommends incorporation of fuses or automatic circuit interrupting devices with requirements for safe renewal and resetting, etc.

U. S. Gov., Dept. of Commerce, Bureau of Mines. Schedule 2C; 1930. Explosion Proof Mine Equipment. Switch Inclosures. Requirements for approval of explosion proof switch inclosures for use in gassy and dusty mines, including structural requirements for lead entrances, thickness of walls, construction and design of joints, bolting, inspection openings and covers, etc., explosion tests.

U. S. Gov., Dept. of Commerce, Bureau of Mines. Schedule 4A; 1922. Procedure for Establishing a List of Permissible Electric Switches and Junction Boxes for Use at the Outer End of Trailing Cables. Requirements on ruggedness of construction, protection of contacts and terminals, tightness of joints, interlocking of switch mechanism and fuses with cover, outside operating handle, etc., test requirements for operation of devices in explosive gas mixtures, scope of bureau's approval, fees.

References.—Inclosures for inclosed switches. *See also* 714.52. Zinc coatings. *See also* 600.3. Cast iron, cast brass, cast bronze. *See also* 611.11, 645.21, 646.41. Steel sheets. *See also* 604.22, 604.23.

715.13 Flexible Tubing for Wire Protection

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 242–215. Nonmetallic Flexible Conduit. For single and double walled tubing for protection of exposed wires, requirements on general structural features, standard sizes, moisture proofing, tensile test, combustion test, kinking test, and heating test requirements.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Non Metallic Conduit; 1929. Recommended requirements on dimensions, weight, paper filler diameter, size and weave of cotton yarn, general construction, saturation with compound, finish, tests for water absorption, softening in oil, bending and flattening, tensile strength, fire resistance.

Underwriters' Laboratories. Flexible Nonmetallic Tubing; 1930. For mechanical protection of insulated electric wires, general structural requirements, standard sizes, test requirements for tension test, flame proofing test, kinking and flattening test, flexibility test, drip test, and moisture absorption test.

U. S. Gov., Federal Specifications Board 57; 1923. Flexible Nonmetallic Tubing. For protection of insulated wire, requirements on construction, tension, flameproofing, flexibility, kinking, flattening, and drip tests.

715.2 SOCKETS, RECEPTACLES, LIGHTING SWITCHES, ROSETTES

715.21 Sockets, Receptacles, Plugs

American Institute of Electrical Engineers Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Plugging receptacles, plugs, switches. For watertight and nonwatertight types, recommended requirements on area of contact surfaces, polarity type for plugs and receptacles, provision of soldering lugs, meeting requirements of Underwriters Laboratories, clearance in boxes and watertight test for watertight types.

American Railway Assn. Mechanical Div. Recommended Practice. Car Lighting; 1927. Includes recommendations on dimensions and design of battery charging receptacle and plug.

American Railway Assn. Mechanical Div. Recommended Practice. Car Lighting; 1927. Includes train line receptacle and connectors, recommended dimensions and design.

American Society of Mechanical Engineers. National Electrical Mfrs. Assn. Rolled Threads for Screw Shells of Electric Sockets and Lamp Bases. Approved by American Standards Assn. as C44–1931. For miniature, candelabra, intermediate, medium, and mogul types, standard pitch, dimensions, shape of threads, gage tolerances.

Assn. of Railway Electrical Engineers 1929 Manual. Electric Train Lighting; 1928. Includes charging receptacle and plug, train line receptacle and train line connector, dimensions and design.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Lamp Holding Devices and Plug Receptacles. Classification of lamp sockets, rating, method of operation, general construction requirements, installation requirements for sockets, attachment plugs and receptacles.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 216. Attachment Plug. For interchangeable separable attachment plugs and receptacles having parallel blade type of contact, of flush, surface, and pendent type, requirements on material in body and cap, dimensions, spacing of parts, etc.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 234–225. Lamp Receptacle and Socket. Requirements on properties of insulating material, minimum thickness of brass cap and shell, number of threads and threading for nipple and screw parts, thickness of lining, structural features, standard form and dimensions for Edison screw shells, spacing of parts, rating, endurance and overload test requirements for switch type sockets, permissible heating at rated current for all types.

Society of Automotive Engineers 1931 Handbook. Bases, Sockets, and Plugs; 1930. Standard dimensions of single and double contact lamp bases, bayonet sockets and plugs, of connector socket for two filament lamps of heavy-duty triple and double contact bayonet sockets and plugs, of socket caps, of base, socket and plug gages, and of triple, double, and single contact screw-type plug and socket connectors.

Society of Automotive Engineers 1931 Handbook. Charging Plug and Receptacle for Electric Vehicles; 1929. Dimensions of 100 amp. and 150 amp. plugs and receptacles.

Society of Automotive Engineers 1931 Handbook. Temperature Test of Insulating Materials; 1914. For connection plugs, sockets, and similar devices used on automobiles, ability for withstanding 300° F. for 30 minutes.

U. S. Gov., Dept. of Commerce, Bureau of Mines. Schedule 2C; 1930. Explosion Proof Mine Equipment. Receptacles and Plugs. Requirements for approval for use in gassy and dusty mines, including requirements on locking to receptacle or to switch for plugs for storage battery locomotives, provision for insertion and withdrawal of plugs without creating ignition hazard, etc.

U. S. Gov., National Screw Thread Commission. Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. American National rolled threads for screw shells of electric sockets and lamp bases. Mandatory for material purchased and used by War and Navy Depts. Requirements on form of thread, threads per inch, and dimensions for miniature, candelabra, intermediate, medium, and mogul sizes, tolerances on threads and on inspection and working gages.

References.—Sockets for radio vacuum tubes. *See* 718.69. Telephone and radio plugs and jacks. *See* 718.21, 718.69. Lamp holders for Christmas tree lighting outfits. *See* 716.39.

715.22 Lighting Switches

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 256–2–25. Snap Switch. Requirements on properties of insulated base, design of base, spacing of supporting screws, structural details, size of wire entrance holes, properties of buttons and handles, thickness of insulating linings and of flush plates, standard ratings in amperes, overload, endurance, and heating tests.

Underwriters' Laboratories. Snap Switches; 1927. Classification, material and mounting of insulating base and of switch parts, sizes of wire holes, clearance required for wires and mounting screws, requirements for terminals, covers, buttons, bushings, etc., test requirements for overload, endurance, and heating.

U. S. Gov., Federal Specifications Board 62; 1923. Snap Switches. Classification, requirements on properties and design of insulating base, mounting of switch parts, nonsoftening of handles, design of terminals and covers, ampere and voltage ratings, overload, endurance, and heating test requirements.

References.—Knife and other type switches. *See* 714.52. Automobile lighting switches. *See also* 722.32. Definitions, symbols, standard voltages, service standards. *See also* 710.

715.23 Rosettes

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Rosettes. Required number of holes, clearance to be provided for wires.

715.3 WIRING AND WIRING SUPPLIES

715.30 General Items

American Electric Railway Engr. Assn. Recommended Rules. E109–25; 1925. Regulations for Wiring Electric Cars and Locomotives (under 60 tons). Minimum sizes of wire, types of conduit, fuses, for signal, lighting, heating, and motor circuits, regulations for wiring, lighting, power and auxiliary apparatus.

American Railway Assn. Signal Section 11020; 1921. Wire Joints. Illustrated method of construction and insulation of wire joints for copper line wires, iron line wires, and for joints between line wires and branch wires, tinning and soldering procedure.

American Railway Assn. Telegraph and Telephone Section. 1–A–23; 1927. Dynamometer Testing of Copper Wire. Rules for testing old line wire on the poles by means of tension dynamometer, loads to be applied and number of breaks allowable before replacement required.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Electric Light Wiring; 1926. In accordance with National Board of Underwriters' Rules and Regulations, general installation requirements, allowable voltage drop, spacing of wires, maximum size of solid wire, etc.

Association of Electragists, International. Electragist Standards for Wiring Installations; 1928. Definitions, types of wiring suitable for use under various conditions, general requirements relating to safety and to operating efficiency, specifications for materials and methods of installing wiring, cables, cabinets, electrical apparatus, etc.

Association of Electragists, International. Electragist Standards for Wiring Installations; 1928. Includes conductors, installation requirements in conduit, in surface metal raceways, in electrical metallic tubing, in underfloor raceways, in open wiring on insulators, in knob and tube wiring, maximum size of wire, type of insulation, number of conductors, spacing of conductors, voltages, etc.

Assn. of Electragists, International. Engineering Design of Residence Wiring; 1931. Recommendations on number and location of outlets and switch control for the various rooms, number and capacity of branch circuits, designs of circuits for fixed appliances, calculation of capacity required for service leads, wiring for signaling and telephone work.

Assn. of Railway Electrical Engineers. 1929 Manual. B–IV–V; 1928. Lamps, Wiring and Accessories. For locomotives, size and base of 32 volt lamps for cab and headlight service, installation of wiring, conduit, junction boxes, terminal blocks, construction requirements for boxes and terminal blocks, conduit according to Am. Rwy. Assn. specifications.

Automotive Electric Assn. Recommended Practice as to Installation and Wiring; 1925. Recommended minimum wire sizes, voltage drops, resistance of ammeter, fuses, etc., installation and insulation of wiring.

National Board of Fire Underwriters. Electric Railway Car Houses and Cars; 1925. Electric wiring requirements, for electric railway cars and locomotives, permissible voltages for lighting circuits, type of conduit, size and installation of ground wires, minimum sizes of conductors, rules for installation, enclosures for control devices, kind of insulation, sizes of fuses.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Outside Supply Conductors. Clearances for overhead lines, number of services per building, insulation, protection and clearance of service wires, entrance service wiring and entrance switch installation requirements, grounding.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Wiring Methods, and installation rules, supports, voltage limits, protective guards, conductors per conduit, sizes and insulation of conductors, grounding, dimensions of cleats, knobs, and tubes, installation requirements for open wires, concealed knob and tube work, conduit work, surface metal raceways, armored cable, underfloor raceways, nonmetallic sheathed cable, metallic tubing.

National Electric Light Assn. Commercial National Section. Minimum Specification for Adequate Wiring of Lighting Circuits in Commercial and Public Structures; 1930. Recommendations on wiring installations based upon 15 ampere fusing of branch circuits, covering number of outlets and size of wire for convenience outlet circuits, spacing of outlets, area per circuit, wattage and wire sizes for lighting circuits, current capacity and voltage drop requirements for feeders, wiring for store buildings, show windows and show cases, convenience outlets for office buildings.

Railway Fire Protection Assn. Handbook; 1925. Electricity as a Fire Danger and Hazards of Electric Wiring and Apparatus. Lists many causes in installation and operation of wiring and apparatus that cause fires, recommends installations be made according to rules of National Electrical Code.

Society for Electrical Development (Inc.). Franklin Specification for Good Lighting; 1929. For commercial and industrial interiors, includes recommendations on wiring, such as area and loading of lighting circuits, sizes of branch circuit wires and feeders, spare circuit, space on panels, and excess size of conduit.

References. — Automobile Wiring. See 722.32. Ground clamps. *See* 719.72. Traveling electric crane wiring. *See* 744.1.

715.31 Insulators

References.—Glass pin insulators. *See* 526.1. Porcelain insulators for electric lines, porcelain switch and fuse bases, cleats, knobs. *See* 532.22. Wood strain insulators. *See* 429.7. Wood insulator pins, steel insulator pins. *See* 429.7, 719.61.

715.32 Insulator Pins

References.—Wood insulator pins. *See* 429.7. Steel insulator pins. *See* 719.61.

715.33 Insulator Knobs

References.—Porcelain knobs and spool insulators. *See* 532.22.

715.34 Lugs

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 212. Air Circuit Breaker. Includes soldering lugs regularly supplied with air circuit breakers, knife and inclosed switches, fuse blocks, panel boards, and switchboards, dimensions of lugs, depth of cable hole, size of stud hole, for wrought copper lugs and cast alloy lugs up to ratings of 1,200 amperes.

Society of Automotive Engineers 1931 Handbook. Cable Terminals; 1928. Copper or brass terminal lugs, made from sheet material with bent-up wings for reception of wire. Dimensions of straight type for generators, switches, meters, and starting motors, dimensions of side type, (wire and lug at 90°), for generators, switches, and meters.

Underwriters Laboratories. Soldering Lugs; 1930. For lugs of copper, brass, or bronze, cast, stamped or swaged, requirements on carrying capacity, diameter and depth of cable hole, thickness of wall, and contact area for various wire sizes.

References.—Other lugs and terminals. *See* 715.35. Castings of copper, brass, bronze. *See also* 642.21, 645.21, 646.41. Sheet material of copper, brass, bronze. *See also* 641.2, 644.2, 646.2. Wiring practice. *See* 715.30.

715.35 Terminals and Tags

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 322–311. Receiver Terminals and Binding Posts. Dimensions of standard cylindrical type cord tip and of standard pin type cord tip, test requirements for strength of soldered connection of tips and terminals, dimensions of standard spade type cable terminal for battery connection conductors, drilling of binding posts to receive cord tips.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 322–313. Spade Type Cable Terminal, for battery connecting conductors of radio receiving sets, dimensions of standard terminal for use with binding posts having No. 8 or No. 6 screws, test requirements for strength of soldered joint at terminal.

Radio Manufacturers Assn. (Inc.). M2–112, M4–111, M4–112; 1930. Cord Tips. For cylindrical type tip and for pin type tip, for use on loud speaker and head-set cords, standard dimensions for several standard sizes, pull test for strength of soldering.

Radio Manufacturers Assn. (Inc.). M4–114; 1930. Cable Terminal. Standard dimensions of spade type cable terminal for outer end of battery connecting conductors on radio receiving sets.

References.—Lugs. *See* 715.34. Battery tray terminal lugs. *See* 721.2. Storage battery terminals. *See* 712.9. *See* references under 715.34.

715.36 Cable Reels and Wire Spools

American Electric Railway Engr. Assn. Recommended Design D109–28; 1929. Trolley Wire Reels, Reel Bushings, and Reel Braking Device. Design for 3 sizes of wooden reel, cast-iron bushing and a braking device, with main dimensions and trolley wire capacities for various sizes of wire.

American Institute of Electrical Engineers. Standard No. 61; 1928. Approved by American Standards Assn., C 8 b2–1928. Soft or Annealed Copper Wire. Includes table of standard package weights, dimensions of standard reels and spools.

Insulated Power Cable Engineers Assn. Shipping Reels for Lead Covered Cable. Undated. Standard sizes and dimensions of cable reels for 7 standard and 1 tentative size with length of cable for each reel for lead covered cable up to 4 inches in diameter.

U. S. Gov., Dept. of Commerce, Bureau of Standards R63; 1928. Metal Spools. Simplified practice recommended and accepted by industry establishing a limited list of standard capacities of metal spools used for annealing, handling, and shipping wire, from 2 to 100 pound capacities.

715.39 Miscellaneous Wiring Supplies

Assn. of Railway Electrical Engineers. 1929 Manual. B–V; 1928. Wiring and Accessories. Includes terminal blocks, general quality requirements, recessing for bolts and creepage distance requirements.

715.4 WIRES, CORDS, AND CABLES

715.40 General Items

American Electric Railway Engr. Assn. D5–14; 1914. Standard electric wire and cable terminology.

American Institute of Electrical Engineers. Standard No. 63; 1928. Joint sponsor with American Electric Railway Assn., American Railway Engineering Assn., American Society for Testing Materials, Assn. of Edison Illuminating Companies, Assn. of Railway Electrical Engineers, National Board of Fire Underwriters, National Electric Light Assn., National Electrical Manufacturers Assn., National Fire Protection Assn. under auspices of American. Standards Assn. as C8 d1–1928. Specifications for 30 Per Cent Rubber Insulation for Wire and Cable for General Purposes. For voltages up to 5,000, requirements on thickness of insulation, its chemical properties, tensile strength and specific gravity, high voltage and insulation resistance test requirements for wire and cable, mechanical tests of insulation.

National Electrical Mfrs. Assn. Publ. No. 31–10; 1931. Switchgear Standards. SG8–61. Current Ratings for Bare Conductors. Standard 60 cycle current ratings for outdoor and indoor installations for 3 conductivity grades of solid copper wire, stranded copper cable, standard and extra heavy iron pipe size copper tubing.

U. S. Gov., Dept. of Commerce, Bureau of Standards C31; 1914. Copper Wire Tables. Tables based on international standard values for resistivity, temperature coefficient, and density of copper as defined by International Electrotechnical Commission. Tables give diameter, cross-sectional area and resistance at various temperatures of copper and of aluminum wire and cable American Wire Gage (B. & S.) with comparison tables for other gages.

U. S. Gov., Dept. of Commerce, Bureau of Standards C67; 1918. Wire Gages. Combined tables of sizes of American (B. & S.) wire gage, steel wire gage, Birmingham (Stubs) wire gage, British standard wire gage, and metric wire gage, with diameters in mils, inches, and metric units, and cross section in square mils, square inches, and metric units.

715.41 Cables, Electrical

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Conductors and Cables. For varnished cambric and rubber insulated cables, requirements on thickness of insulation for various wire sizes and working voltages, high voltage and insulation resistance tests, stranding and dimensions for braided cable, armored cable, and leaded and armored cable, construction, chemical composition of rubber compound, thickness, dielectric strength, and bend test of varnished cambric, thickness of insulation, covers single, two-conductor, three-conductor, and interior communication cable.

American Electric Railway Engr. Assn. D3–14; 1914. High Voltage Three-Conductor Paper Insulated Lead Covered Cable. Requirements on construction, dimensions of stranded conductors, insulating materials, dielectric and insulation resistance tests, sampling, installation of cable, tests after installation.

American Electric Railway Engr. Assn. D4–12; 1912. Single-Conductor Paper Insulated Lead Covered Cable for 1,200 Volts. Requirements on size and stranding of conductors, type and application of insulation, thickness of sheath, dielectric and insulation resistance tests, sampling, installation, and tests after installation.

American Electric Railway Engr. Assn. D10–30; 1930. Rubber Insulated Wire and Cable for Power Distribution Purposes. Requirements on stranding, tests of tinning, thickness of insulation, chemical and physical properties of 30 per cent rubber insulation, electrical tests of conductor, requirements for weatherproof compound, braid tape, lead sheath and armor.

American Electric Railway Engr. Assn. Misc. methods and practices E216–27; 1927. Motor leads. Minimum recommended sizes of cables, extra flexible, rubber insulated with water proof braid, for various horsepower motors. Recommended connectors, supports, and uniform marking of motor leads.

American Institute of Electrical Engineers. Standard No. 30; 1928. Wires and Cables. For bare, rubber insulated, varnished cloth insulated, paper insulated wire and cable, definitions, methods of making high voltage test, of measuring insulation resistance and capacitance, standard stranding, stranding for flexible cables, high voltage test requirements. 1925 edition available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practice for Electrical Installations on Shipboard. Cables. Recommended requirements on construction, stranding, size of individual wires, dimensions over braids, various insulations, lead sheath and armor, for rubber insulated and for varnish cambric insulated single conductor, 2 conductor, and 3 conductor cables, thickness and quality of insulation, maximum load for continuous and for intermittent service, quality of braid, sheathing, and armor, voltage and insulation resistance tests. Covers braided, armored, leaded and armored power and lighting cable, interior communication cable, telephone cable, two and three conductor portable cable, and bell wire.

American Railway Assn. Electrical Section. XIX–a–21; 1921. Electric Wires and Cables. Requirements on construction and stranding, permissible variations from nominal dimensions, conductivity, and elongation of soft and of hard drawn copper wire and cable, extensometer test and tensile strength of hard drawn wire, chemical composition of 30 per cent and of 33 per cent rubber insulation, thickness of rubber insulation for various voltages, elasticity, elongation, permanent set, and tensile strength tests of rubber, general quality of varnished cloth insulation, application and thickness of varnished cloth insulation, general quality of paper and impregnating compound for paper insulation, thickness of paper insulation, tensile strength of paper, high potential and insulation resistance tests for wires and cables insulated with rubber, varnished cloth, or impregnated paper, application and thickness of braids, thickness and composition of lead sheath, armoring, sizes, strength, and galvanizing of armor wire, sizes and galvanizing of steel tape armor, galvanizing and test of galvanizing.

American Railway Assn. Signal Section. 5416; 1916. Aerial Aluminum Cable, Steel Reinforced. One steel core wire and 6 aluminum wires, tensile strength requirements for aluminum wire, for steel wire, and for cable for different sizes, conductivity requirements for aluminum.

American Railway Assn. Signal Section. 8930; 1930. Aerial Braided Cable for 660 Volts or Less. Requirements on conductivity of copper, taping, filling, and braiding, proportion of ingredients in the dry materials used in rubber compound, thickness and chemical composition of rubber insulation, tensile test and specific gravity of insulation, high voltage and insulation resistance test requirements for insulated wire.

American Railway Assn. Signal Section 9031; 1931. Armored Submarine Cable for 660 Volts or Less and for 2,300 Volts or Less. Quality and percentages of rubber, whiting, etc., in dry ingredients of insulation, construction, taping, thickness of insulation, of lead, size of armor wire, weight of impregnated outer cover, test requirements for conductivity, elongation, wrapping, and tinning of copper conductor, galvanizing and strength of armor wire, strength, specific gravity, and chemical test of insulation, high voltage and insulation resistance of cable.

American Railway Assn. Signal Section 9131; 1931. Lead Covered Cable for 660 Volts or Less and for 2,300 Volts or Less. Quality and percentages of rubber, whiting, etc., in dry ingredients of insulation, construction, taping, thickness of insulation and of lead, test requirements for conductivity, elongation, wrapping and tinning of copper conductor, tensile, specific gravity, and chemical test of rubber, high voltage and insulation resistance of cable.

American Railway Assn. Signal Section. 9420; 1921. Underground Braided Cable for 660 Volts or Less. Quality and percentages of rubber, whiting, etc., in dry ingredients of insulation, construction, taping, braiding, thickness of rubber, test requirements for conductivity, elongation, wrapping, and tinning of copper conductors, tensile, specific gravity, and chemical test of rubber, high voltage and insulation resistance of cable.

American Railway Assn. Signal Section 14529; 1929. Parkway Cable. Mineral matter rubber compound insulated signal wire, lead sheathed and steel armored for 660 volts or less, elongation, conductivity, and tinning test requirements for copper conductor, construction of cable, thickness and quality of lead, asphalt impregnation of jute coverings, dimensions and strength of steel tape, percentage requirements for rubber, whiting, zinc oxide, etc., in rubber mixture, thickness of insulation, chemical composition and extract percentages for vulcanized rubber, tensile test and specific gravity of rubber insulation, high voltage and insulation test requirements for cable.

American Railway Assn. Telegraph and Telephone Section. 1–A–9; 1925. Paper Insulated, Lead Covered Telegraph and Telephone Cable with High Insulation. Dimensions and tensile strength requirements for the copper conductors, construction, strength, and resistance of joints in conductors, thickness of insulating paper and of lead sheath, construction of cable, color code of pairs, test requirements for conductor resistance, dielectric strength, dissipation constant, electrostatic capacity, capacity unbalance, insulation resistance for 2 grades of cable dependent on dielectric strength, shipping weights.

American Railway Assn. Telegraph and Telephone Section. 2–G–1; 1924. Lead Sheath Office Cable. Cable on nonquadded twisted pair of cotton covered enameled or silk and cotton covered enameled No. 18 copper conductors, wrapping test of enameled wire, number of layers of insulation, composition and thickness of lead sheath, color code, conductor resistance, dielectric strength, insulation resistance, electrostatic capacity, and mutual capacity requirements.

American Railway Assn. Telegraph and Telephone Section. 2–G–2; 1924. Braided Office Cable. Cable of nonquadded twisted pairs of rubber insulated No. 16 copper conductors, construction of cable and number of pairs, thickness and general quality requirements of insulation, tinning test, tensile test of insulation, chemical composition of rubber, conductor resistance, dielectric strength, and insulation resistance test requirements.

American Railway Assn. Telegraph and Telephone Section. 2–G–19; 1926. Lead Sheath Office Cable Quadded. Cable constructed of quads of No. 18 copper conductors enameled and with cotton or silk and cotton covering, permissible type and strength of joints, thickness of enamel and wrapping test requirements, number of layers, structure, and colors of braid, construction of cable, thickness of sheath, conductor resistance, dielectric strength, insulation resistance, electrostatic capacity, and capacity unbalance test requirements.

American Railway Assn. Telegraph and Telephone Section. 2–G–22; 1927. Braided Office Cable of Quadded Rubber Insulated No. 16 A. W. G. Conductors. Rubber according to A. S. T. M. specifications, construction and weatherproofing of braid, construction, thickness of insulation, and color code for 12 and 20 conductor cables, tinning test, tensile test of rubber, chemical test of rubber, resistance, dielectric strength, and insulation resistance test requirements.

American Society for Testing Materials B 8–27; 1927. Bare Concentric-Lay Copper Cable, Hard, Medium Hard or Soft. Covers class A for bare, weatherproof, slow-burning, slow-burning weatherproof cable for aerial use; class B for rubber, paper, varnished cloth insulated cable; class C for a more flexible cable than provided in class B. Wires to be according to A. S. T. M. specifications for hard drawn, medium hard drawn, and soft copper wire construction, tension tests of wires, standard dimension, and stranding of cables.

American Society for Testing Materials. Tentative Specifications D 27–31T; 1931. Insulated Wire and Cable; 30 Per Cent Hevea Rubber. Requirements on construction, tolerances on dimensions, tension test, conductivity, and tinning test for conductors; chemical composition, percentages of various extracts, permissible sulfur, and tension test requirements for 2 classes of rubber insulation of which one contains antioxidants and organic accelerators; thickness of insulation, dielectric strength and electrical resistance test requirements for wire and cable; dimensions, construction and application of rubber filled tape, cotton braid, and lead sheath.

Assn. of Electragists, International. Electragist Standards for Wiring Installations; 1928 Includes armored cable, installation requirements, connectors, bushings, supports, protection, grounding.

Insulated Power Cable Engineers Assn. Recommended Walls of Insulation and of Lead Sheaths for Paper Lead Power Cables; 1930. Recommended thicknesses of paper insulation and of lead sheath for 3-conductor cable, shielded type and belted type, grounded neutral and ungrounded neutral, sizes up to 2/0 and voltages up to 35,000; for single conductor cable, shielded or nonshielded type, grounded or ungrounded neutral, sizes up to 4/0 and larger, voltages up to 69,000.

Insulated Power Cable Engineers Assn. Varnished Cambric Insulated Cables; 1932. For lead covered or braided cable, underground, aerial, or station cable, for voltages up to 17,000, requirements on stranding, tensile test and resistance of copper, tensile strength, thread count, thickness of cloth and of insulation, dielectric test, and heat test of varnished cambric cloth, recommended thicknesses of insulation and of lead sheath for various cable sizes and voltages, single and multiple conductor cable, required thickness of braid for braided cables, requirements on resistance test, high voltage test, insulation resistance and test, and bend test.

International Assn. of Municipal Electricians. Underground and Aerial Cable for Fire Alarm, Police, Telegraph, Traffic Signal and Street Lighting Service; 1928. Includes rubber insulated cables lead encased also lead encased and steel armored for underground signalling and lighting circuits, and rubber insulated cotton braid covered cables for aerial signal circuits. Elongation, twist, wrap test, tinning, and conductivity test requirements for copper conductor, thickness, chemical composition, specific gravity, tensile strength, dielectric strength, and insulation resistance requirements for rubber insulation, construction of cable, thickness of lead sheath and of steel armor, construction of woven cotton sheath.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Conductors. Type and thickness of insulation, voltage limits, braid coverings, standard stranding for armored cable and nonmetallic sheathed cable, demand calculations for feeder sizes.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 254–221. Standards for Intercommunicating Telephone Cable. Requirements on size of conductors for talking circuits and for common wires, copper conductors insulated with single silk and single cotton saturated with beeswax, cotton braiding or lead sheath for outer covering, color code for cable up to 31 pairs.

Radio Manufacturers Assn. (Inc.). M4–505, M4–506; 1930. Power Cable. For receiving equipment with separate power supply, standard terminal markings for the power cable supplying A and B power.

Society of Automotive Engineers 1931 Handbook. Insulated Cables; 1926. For low-tension and high-tension ignition cables, dimensions of stranded copper wire and insulated cable for plain rubber insulated, for rubber insulated with braid cover, for varnished cambric insulated with braid cover, for rubber and varnished cambric insulated with braid cover; quality and tension test requirements for rubber, thickness and high voltage test requirements for varnished cambric tape, construction and impregnation of braid, oil test requirements for braid, tinning test requirements for wire.

Society of Automotive Engineers 1931 Handbook. Insulated Cable; 1926. Lighting and Starting Motor Cable. For rubber insulated and braid covered, for varnished cambric insulated and braid covered, for rubber insulated and armored, and for varnished cambric insulated and armored cables, quality and tension test requirements for rubber, construction, impregnation, and oil test requirements for braid, application, thickness, and high-voltage test requirements for varnished cambric, construction and dimensions of galvanized or sherardized steel, brass, aluminum, or copper armor.

Underwriters Laboratories. Armored Cable and Armored Cord; 1929. For cord and cable made up of standard rubber covered conductors, requirements on braid coverings, lay of twist, over all dimensions, minimum thickness of armor, its internal diameter, weight, and convolutions for various wire sizes, test requirements on armor for zinc coatings, crushing, tension, ohmic resistance, tightness on conductor, test requirements on cord and cable for elongation, flexibility, and dielectric strength.

Underwriters' Laboratories. Motion-Picture Cable and Stove Wire; 1921. Single copper conductors with asbestos covering for exposed leads in motion picture machines, heaters and stoves, but not suitable for moist places or use in conduit. Conductivity, limiting sizes of and stranding of conductors, thickness and carbon content of asbestos covering, flame and bend test requirements.

Underwriters' Laboratories. Nonmetallic Sheathed Cables; 1927. Limiting sizes and number of conductors, construction and limiting diameters for rubber insulated braid covered conductors, covered with fibrous saturated protective sheath and assembled into cable with outer cotton braid covering, test requirements for moisture absorption, flame retardation, flexibility, tension, crushing, dielectric strength.

U. S. Gov., Dept. of Commerce, Bureau of Mines. Schedule 2C; 1930. Explosion Proof Mine Equipment. For Trailing Cables for connection of portable apparatus, rubber insulated, requirements for approval including tests in which 7-ton mine car is run over cable, how approval for use in gassy and dusty mines is obtained, etc.

U. S. Gov., Federal Specifications Board. 65; 1923. Rubber Covered Wires and Cables (For Ordinary Purposes). Wire sizes according to A. I. E. E. standards, dimensional tolerances, conductivity, splicing, and tinning requirements, adhesion requirements for rubber, construction of fibrous covering, construction of lead covered cables and thickness of lead, chemical and tensile test requirements for rubber, high voltage and insulation resistance test requirements for cables.

References.—Electric cord. *See* 715.42. Copper wire, bare and insulated. *See also* 715.44. Cable terminology, rubber insulation, wire tables and gages. *See also* 715.40. Wiring methods and practice. *See also* 715.30. Definitions, symbols, methods of test, service standards, safety codes. *See also* 710. Copper bars, copper rods for wire drawing. *See* 641.11, 642.11. Methods of testing and general requirements for metals. *See also* 641.0, 600.1. Zinc coatings, tin coatings. *See also* 600.3. Methods of testing rubber goods. *See also* 200. Pig lead. *See* 651.1. Rubber insulation and tapes. *See also* 719.55. Insulating cloths and tapes. *See also* 719.56. Insulating paper, asbestos insulation. *See also* 719.52, 719.51. Methods of testing cable splicing and pothead compounds. *See* 719.50 Cable reels. *See* 715.36.

715.42 Cords, Electrical

American Railway Assn. Telegraph and Telephone Section. 2–G–11; 1924. Single Conductor Cord ARA–5–A. For use on telephone switchboards of the pin-jack type, size of wire and number of strands for conductor, thickness of rubber insulation, asbestos braid and of cotton braid, details of construction of cord and of ends, conductor resistance and dielectric strength requirements.

American Railway Assn. Telegraph and Telephone Section. 2–G–28; 1927. Double Conductor Patching Cord ARA–2–A. For use with telephone switchboards of pin-jack type, consisting of two tinsel conductors with filler of twine, detail dimensions and construction, resistance, strength of soldered joints, and dielectric strength test requirements.

American Railway Assn. Telegraph and Telephone Section. 2–G–29; 1927. Double Conductor Switchboard Cord ARA–3–A. For use in cutting operators' set, consisting of two copper tinsel conductors with filler of twine, detail dimensions and construction, resistance, strength of soldered joints, and dielectric test requirements.

American Railway Assn. Telegraph and Telephone Section. 2–G–32; 1928. Reverse Double Conductor cord ARA–4–A. For use with pin-jack type switchboards, consisting of two copper tinsel conductors and twine filler covered with cotton braid, construction details and dimensions, test requirements for conductor resistance, strength of soldered joint with cord tip, and dielectric strength.

American Railway Assn. Telegraph and Telephone Section. 2–G–33; 1928. Single Conductor Cord ARA–1–A. For cutting in operators at telephone switchboards, consisting of one copper tinsel conductor and twine filler covered with cotton braid, detail construction, dimensions, test requirements for conductor resistance and strength of soldered connections.

Association of Electragists, International Electragist Standards for Wiring Installations; 1928. Includes flexible cords, general installation requirements, types of flexible cords approved for given uses.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn. C1–1931. Conductors. Includes flexible cords and fixture wire, type and thickness of insulation, voltage limits, number and treatment of braid coverings, standard stranding, and approved uses for flexible cords.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 323–211. Connection Cords. Dimensions, colored thread tracer standards, and voltage breakdown test requirements for radio head set, radio loud speaker, and extension cords.

Underwriters Laboratories. Armored Cable and Armored Cord; 1929. For cord and cable made up of standard rubber covered conductors, requirements on braid coverings, lay of twist, overall dimensions, minimum thickness of armor, its internal diameter, weight, and convolutions for various wire sizes, test requirements on armor for zinc coatings, crushing, tension, ohmic resistance, tightness on conductor, test of cord and cable for elongation, flexibility, and dielectric strength.

Underwriters' Laboratories. Flexible Cord; 1928. Covers small flexible cable insulated to withstand wear, sizes of wires, conductivity, construction, chemical, tensile, and adhesion test requirements for rubber insulation, thickness of rubber, saturation of braids and fillers. Covers lamp cord, reinforced cord, parallel cord, twisted portable, moisture proof reinforced, braided heavy-duty cord, and elevator cable.

Underwriters' Laboratories. Heat Resisting Fixture Wire and Flexible Cord; 1929. For single conductor fixture wire and multiple conductor flexible cord, asbestos insulated type and cotton insulated type, limiting sizes, stranding of conductors, conductivity of copper, thickness and construction of insulation, carbon content of asbestos, adhesion, flexibility, dripping of compound, flame-resisting properties, and dielectric strength test requirements.

Underwriters' Laboratories. Heater Cord; 1927. For portable use on voltages up to 300, minimum strand wire sizes, conductivity, tinning or separator requirements, construction of coverings, thickness and sulphur content of rubber in rubber insulated cord, closeness, weight, thickness, carbon content of asbestos in asbestos insulated cord, durability requirements of cords on twist testing machines.

Underwriters' Laboratories. Rubber Sheathed Cords; 1922. Type for use in garages and factories, and type for office and dwelling use. Size of conductors, construction of cord, quality of rubber, thickness of insulation, outside dimensions, chemical and tensile test requirements on insulation and outer sheath, continuity and kink test of cord.

References.—Electric cables. *See also* 715.41. Copper wire, bare and insulated. *See also* 715.44. Terminology, rubber insulation, wire tables and gages. *See also* 715.40. Wiring methods and practice. *See also* 715.30. Definitions, symbols, methods of test, service standards, safety codes. *See also* 710. Copper bars, copper rods for wire drawing. *See* 641.11, 642.11. Methods of test and general requirements for metals. *See also* 641.0, 600.1. Zinc coatings, tin coatings. *See also* 600.3. Methods of testing rubber goods. *See also* 200. Rubber insulation and tapes. *See also* 719.55. Insulating cloths and tapes. *See also* 719.56. Asbestos insulation. *See also* 719.51.

715.43 High Resistance Wire

American Railway Assn. Signal Section 2211; 1911. Galvanized E. B. B. Bonding Wires. No. 8 B. W. G. wire for bonding rail joints of steam railroads, general quality, diameter, strength, elongation, and resistance requirements, test requirements for galvanizing by copper sulphate method.

American Railway Assn. Signal Section 3212; 1912. Double Braided, Weatherproof Galvanized B. B. Line Wire. General quality, diameter, strength, elongation, resistance requirements for wire, galvanizing test requirements, thickness and application of saturated braid, melting and freezing test requirements for weatherproof braid.

American Railway Assn. Signal Section 7018; 1918. Copper Clad Steel Bonding Wire. For bonding joints of steam railroads, size No. 6, general quality, diameter, elongation, conductivity, and test for separation of copper requirements.

American Railway Assn. Signal Section. 7131; 1931. Double Braided Weatherproof Thirty Per Cent Conductivity Copper-Covered Steel Line Wire. Copper cover welded onto steel core, requirements on diameter, strength, resistance, and bend test for 5 sizes of wire, weave and impregnation of weatherproof covering, drip test, bending test, melting and freezing test, of insulated wire, standard weights.

American Railway Assn. Telegraph and Telephone Section. 1–A–14; 1927. Galvanized Iron Wire. Resistivity, tensile strength, dimensions, and ductility test requirements for 5 sizes of B. W. G. gage, galvanizing according to A. R. A. serial 1–D–5.

American Railway Assn. Telegraph and Telephone Section. 1–A–16; 1927. Galvanized Iron Tie Wires. Diameter and length, wrapping and tensile strength test requirements, galvanizing according to A. R. A. specification 1–D–5, for 2 sizes.

American Society for Testing Materials A 111–30; 1930. Zinc Coated (Galvanized) Iron or Steel Telephone and Telegraph Line Wire. Weight of coating, tensile strength, elongation, twist, and electrical resistance test requirements, permissible variations from nominal sizes, minimum length of wire in coil, test procedure according to A. S. T. M. method A 110.

American Society for Testing Materials A 112–30; 1930. Zinc Coated (Galvanized) Iron or Steel Tie Wires. For use in tying telephone or telegraph line wire to insulators, zinc according to A. S. T. M. specifications B 6, weight of coating, tensile strength, elongation requirements, size and permissible variations, test procedure according to A. S. T. M. method A 110.

American Society for Testing Materials B 63–29; 1929. Method of Test for Resistivity of Metallic Materials for Resistors. Methods of making measurements of dimensions of specimen and computation of resistivity from resistance measurement, for an accuracy of 1 per cent.

American Society for Testing Materials B 70–30; 1930. Method of Test for Change of Resistance with Temperature of Metallic Materials for Electrical Heating. Applicable at temperatures up to 500° C. or higher. Preparation of specimen, size and type of leads, determination of proper test current, method of test and accuracy required for determination of resistance and temperature, using electric furnace.

American Society for Testing Materials. Tentative Methods B 71–29T; 1929. Methods of Chemical Analysis of Metallic Materials for Electrical Heating. Reagents required and methods of determination of nickel, chromium, iron, manganese, carbon, insoluble residue, silicon, sulphur, copper, descriptions and illustrations of test apparatus.

American Society for Testing Materials. Tentative Test Method B 76–29T; 1929. Accelerated Life Test for Metallic Materials for Electrical Heating. Covers determination of resistance to oxidation at high temperatures by heating a wire specimen through a prescribed schedule of high temperature and rest periods until burnout of specimen, dimensions and design of test board, requirements for auxiliary measuring apparatus and interrupter, size of specimen, test procedure.

American Society for Testing Materials. Tentative Standard B 77–30T; 1930. Method of Test for Thermoelectric Power. For determining the suitability of different metals for use in resistance apparatus in which a low thermoelectric power is desired, measurement made with respect to copper, definition of thermoelectric power, requirements on test specimen and test procedure.

American Society for Testing Materials. Tentative Specifications B 82–31T; 1931. Drawn or Rolled Alloy, 80 Per Cent Nickel, 20 Per Cent Chromium, for Electrical Heating Elements. For wire, ribbon, rod, requirements on annealing, chemical composition, resistance, temperature coefficient of resistance, packing, life test where required, using A. S. T. M. test methods B 71, B 63, B 70, B 76.

American Society for Testing Materials. Tentative Specifications B 83–31T; 1931. Drawn or Rolled Alloy, 60 Per Cent Nickel, 15 Per Cent Chromium, and Balance Iron, for Electrical Heating Elements. For wire, ribbon, or rod, requirements on annealing, chemical composition, resistance, temperature coefficient of resistance, packing, life test where required, using A. S. T. M. test methods B 71, B 63, B 70, B 76.

American Society for Testing Materials. Tentative Standard B 84–31T; 1931. Method of Test for Determining the Temperature Resistance Constants of Resistance Alloys. For wires of the manganin and constantan types to be used in precision electrical instruments, sampling and test procedure.

International Assn. of Municipal Electricians. Underground and Aerial Cables for Fire Alarm and Police Telegraph and Traffic Signal Service. Weather proof Copper Covered Steel Wires; 1926. For aerial service, No. 10 and No. 12 A. W. G. sizes, requirements on conductivity, breaking strength, resistance, test of weld of copper to steel, permissible variations in diameter, elongation, thickness of braid, melting and freezing test of impregnating compound, testing methods.

References.—Copper wire, bare and insulated. *See* 715.44. Terminology, wire tables and gages. *See also* 715.40. Wiring methods and practice. *See also* 715.30. Definitions, symbols, methods of test, service standards, safety codes. *See also* 710. Methods of test and general requirements for metals. *See also* 600.1. Zinc coating, tin coatings. *See also* 600.3. Asbestos insulation. *See also* 719.51. Resistors, electric heaters. *See* 714.12, 717.1.

715.44 Low Resistance Wires

American Electric Railway Engr. Assn. D1–16; 1916. Standard Copper Wire Tables. Based on the 1913 international standard of resistivity of annealed copper. Dimensions and resistances tabulated with temperatures for bare solid wire, and stranding tables for bare concentric cable and for flexible cables.

American Electric Railway Engr. Assn. D2–30; 1930. Round and Grooved Hard Drawn Copper Trolley Wire. Prepared jointly with Am. Soc. for Testing Materials. Copper in accordance with A. S. T. M. Spec. B 5 or B 4, requirements on tensile strength, elongation, and resistivity, twist test for round wire, standard sections for grooved wire.

American Electric Railway Engr. Assn. D10–30; 1930. Rubber Insulated Wire and Cable for Power Distribution Purposes. Stranding, tests of tinning, thickness of insulation, chemical and physical requirements for 30 per cent rubber insulation, electrical tests of conductor, requirements for weather proof compound, braid, tape, lead sheath, and armor, in conformity with American Standards Assn. Spec. C 8 d1–1928 (A. I. E. E. No. 63) for rubber insulation.

American Electric Railway Engr. Assn. D12–30; 1930. Bronze Trolley Wire. Prepared jointly with Am. Soc. for Testing Materials. Copper in accordance with A. S. T. M. Spec. B5 or B4, requirements on tensile strength, elongation, resistivity, dimensions for 2 strength grades of round and of grooved wire, twist test for round wire, standard sections of grooved wire.

American Institute of Electrical Engineers Standard No. 30; 1928. Wires and Cables. For bare, rubber insulated, varnished cloth insulated, and paper insulated wire and cable, definitions, methods of making high voltage test, of measuring insulation resistance, of measuring capacitance, standard stranding, stranding for flexible cables, high voltage test requirements. 1925 edition available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engineers. Standard No. 46; 1927. American Standards Assn. C 11–1927. Hard Drawn Aluminum Conductors, Standard values of resistivity, resistance-temperature coefficient, density, and length-temperature coefficient and explanatory notes.

American Institute of Electrical Engineers Standard No. 60; 1928. Joint sponsors with American Electric Railway Assn., American Railway Engineering Assn., American Society for Testing Materials, Assn. of Edison Illuminating Cos., Assn. of Railway Electrical Engineers, National Board of Fire Underwriters, National Electric Light Assn., National Electrical Mfrs. Assn., National Fire Protection Assn. under auspices of American Standards Assn. C 8 b1–1928. Specifications for Tinned Soft or Annealed Copper Wire. Tensile strength, resistivity, dimensions, tinning and tests thereof.

American Institute of Electrical Engineers. Standard No. 61; 1928. Joint sponsor with American Electric Railway Assn., American Railway Engineering Assn., American Society for Testing Materials, Assn. of Edison Illuminating Companies, Assn. of Railway Electrical Engineers, National Board of Fire Underwriters, National Electric Light Assn., National Electrical Mfrs. Assn., National Fire Protection Assn. under auspices of American Standards Assn., C 8 b2–1928. Specifications for Soft or Annealed Copper Wire. Tensile strength, resistivity, dimensions and measurements, table of package weights and dimensions of reels and spools.

American Institute of Electrical Engineers. Standard No. 69; 1928. Joint sponsor with American Electric Railway Assn., American Railway Engineering Assn., American Society for Testing Materials, Assn. of Edison Illuminating Companies, Assn. of Railway Electrical Engineers, National Board of Fire Underwriters, National Electric Light Assn., National Electrical Mfrs. Assn., National Fire Protective Assn. under auspices of American Standards Assn., C 8 j1–1928. Specifications for Cotton Covered Round Copper Magnet Wire. Maximum and minimum dimensions of insulated wire, bend test on the insulated wire.

American Institute of Electrical Engineers. Standard No. 70; 1928. Joint sponsor with American Electric Railway Assn., American Railway Engineering Assn., American Society for Testing Materials, Assn. of Edison Illuminating Companies, Assn. of Railway Electrical Engineers, National Board of Fire Underwriters, National Electric Light Assn., National Electrical Mfrs. Assn., National Fire Protection Assn. Under auspices of American Standards Assn. C 8 j2–1928. Specifications for Silk Covered Round Copper Magnet Wire. Maximum and minimum diameters and bend test on silk covered wire.

American Institute of Electrical Engineers. Standard No. 71; 1928. Joint sponsor with American Electric Railway Assn., American Railway Engineering Assn., American Society for Testing Materials, Assn. of Edison Illuminating Companies, Assn. of Railway Electrical Engineers, National Board of Fire Underwriters, National Electric Light Assn., National Electrical Mfrs. Assn., National Fire Protection Assn. under auspices of American Standards Assn. C 8 j3–1928. Specifications for Enameled Round Copper Magnet Wire. Minimum and maximum addition of enamel, solubility, adherence, flexibility, aging, softening, and high-voltage tests.

American Railway Assn. Electrical Section. XIX–a–21; 1921. Electric Wires and Cables. Requirements on construction and stranding, permissible variations from nominal dimensions, conductivity, and elongation of soft and of hard drawn copper wire, extensometer test and tensile strength of hard drawn wire, chemical composition of 30 per cent and of 33 per cent rubber insulation, thickness of rubber insulation, elasticity, elongation, permanent set, and tensile strength tests of rubber, general quality of varnished cloth insulation, thickness of insulation, high potential and insulation resistance tests for wires insulated with rubber or with varnished cloth, application and thickness of braids.

American Railway Assn. Signal Section 4113; 1913. Enameled Copper Magnet Wire. Resistivity, permissible variation in diameter of soft drawn copper wire, diameter limits for enameled wire, tension test requirements for copper wire, flexibility, resistance to cracking, peeling, and scratching test requirements for enamel, softening in oil and dielectric strength test requirements.

American Railway Assn. Signal Section 7218; 1918. Double Braided, Weather proof Hard Drawn Copper Line Wire. General quality, diameter, strength, elongation, and conductivity requirements for 6 sizes of wire, thickness of braid, application of weatherproof compound, melting and freezing test requirements for weather proof compound.

American Railway Assn. Signal Section 10820; 1921. Copper Bond Wire; 1921. Soft drawn No. 6 circular wire, conductivity, diameter, and elongation requirements.

American Railway Assn. Signal Section 11129; 1929. Mineral Matter Rubber Compound Insulated Signal Wire. For 660 volts or less, requirements for size, quality, and percentages of dry rubber, whiting, zinc oxide, etc., in rubber compound, thickness of insulation, chemical composition, tensile test, high voltage test, and insulation resistance requirements for insulation, elongation and tinning test of wire, hardening and absorption test requirements for braid.

American Railway Assn. Telegraph and Telephone Section. 1–A–13; 1927. Hard Drawn Bare Copper Wire. Resistivity requirements, test requirements for dimensions, and tensile strength, length and weight of wire coils, for 2 sizes of B. W. G. and 5 sizes of A. W. G.

American Railway Assn. Telegraph and Telephone Section. 1–A–15; 1927. Annealed Copper Tie Wires. For commercially pure copper wire, dimensions, lengths and wires per bundle, tensile strength requirements, for 6 sizes.

American Railway Assn. Telegraph and Telephone Section. 2–G–15; 1925. Twisted Pair Inside Wire. Twisted pair, waxed braid, rubber insulated, annealed copper wire of No. 18 or No. 16 sizes, size of braid thread, weatherproofing material, quality and thickness of rubber insulation, color code, lay of wire, tinning, elongation, and wrapping test requirements for conductor, tensile strength, specific gravity, chemical composition, dielectric strength, insulation resistance requirements of rubber insulation, adhesion test of braid, melting test of weather proofing, resistance of conductor.

American Railway Assn. Telegraph and Telephone Section. 2–G–16; 1925. Single Conductor Inside Wire. For waxed braid rubber insulated wire of No. 18 or No. 16 size, thickness of insulation, construction of cotton braid, tinning, elongation, wrapping, and resistance test requirements for conductor, tensile strength, specific gravity, chemical composition, wrapping test, dielectric strength, insulation resistance test requirements for the rubber insulation, adhesion test requirements for braid, and melting test for weather proofing compound.

American Society for Testing Materials. B 1–27; 1927. Hard-Drawn Copper Wire. Approved by American Standards Assn. as H 14–1929. Requirements on tensile strength, resistivity, and unit for designating diameter, permissible variations in dimensions.

American Society for Testing Materials B 2–27; 1927. Medium Hard-Drawn Copper Wire. Tension test requirements, resistivity, dimensions and permissible variations.

American Society for Testing Materials B 9–30; 1930. Bronze Trolley Wire. For round and grooved trolley wire, of high strength and of medium strength, copper according to A. S. T. M. specifications, tension test and resistivity requirements, twist test requirements for round wire, dimensions and permissible variations.

American Society for Testing Materials B 33–21; 1921. Approved by American Standards Association as C8b1–1928. Tinned Soft or Annealed Copper Wire for Rubber Insulation. Test requirements for quality of tinning, tensile strength, resistivity, permissible variation in dimensions.

American Society for Testing Materials B 47–30; 1930. Round and Grooved Hard Drawn Copper Trolley Wire. Material to be in accordance with A. S. T. M. specifications for electrolytic copper wire bars (Serial B5) or for lake copper wire bars (Serial B 4), twist test requirements for round wire, tension test requirements, resistivity, dimensions, and permissible variations for round and grooved wire.

American Society for Testing Materials B 48–27; 1927. Soft Rectangular Copper Wire. Quality according to A. S. T. M. specifications for copper wire bars, tension test requirements, resistivity, dimensions and permissible variations.

American Society for Testing Materials. Tentative Specifications. D 27–31T; 1931. Insulated Wire and Cable: 30 Per Cent Hevea Rubber. Requirements on construction, tolerances on dimensions, tension test, conductivity, and tinning test for conductors; chemical composition, percentages of various extracts, permissible sulphur, and tension test requirements for 2 classes of rubber insulation of which one contains antioxidants and organic accelerators; thickness of insulation, dielectric strength and electrical resistance test requirements for wire and cable; dimensions, construction and application of rubber filled tape, cotton braid, and lead sheath.

Assn. of Railway Electrical Engineers. 1929 Manual. G–I–1; 1928. Tinned Soft or Annealed Copper Wire for Rubber Insulation. G–I–2 1928. Soft or Annealed Copper Wire. G–I–3; 1928. 30 Per Cent Rubber Insulation for Wire and Cable for General Purposes, G–I–4, 1928. Cotton Covered Round Copper Magnet Wire. G–I–5, 1928. Silk Covered Round Copper Magnet Wire. G–I–6; 1928. Enameled Round Copper Magnet Wire. All the above are the same as those of same title of Am. Inst. of Elec. Engrs. as approved by Am. Standards Assn.

International Assn. of Municipal Electricians. Underground and Aerial Cable for Fire Alarm, Police, Telegraph, Traffic Signal and Street Lighting Service; 1928. Includes flame proof single conductor rubber insulated wire and weather proof single conductor rubber insulated wire, the latter for offices and switchboards for signalling systems. Elongation, twist, wrap test, tinning and conductivity test requirements for copper conductor, thickness, chemical composition, specific gravity, tensile strength, dielectric strength, and insulation resistance requirements for the rubber insulation, weave and saturation requirements for braid.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Conductors. Type and thickness of insulation, voltage limits, number and treatment of braid coverings, and standard stranding for rubber covered wire, varnished cambric insulated wire, asbestos covered and slow burning wire, weather proof wire, fixture wire, flexible cords, armored cable, nonmetallic sheathed cable. Demand calculations for feeder sizes, approved uses for flexible cords.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Magnet Wire; 1924. Covers cotton covered, silk covered, enameled, enameled with cotton or silk covering, both single and double coverings, requirements for thickness of coverings, toughness and solubility of enamel, wrapping test of the insulated wire, and for enameled wire elongation, temperature, and high voltage test requirements, dimensions of standard packing spools.

Society of Automotive Engineers 1931 Handbook. Soft or Annealed Copper Wire; 1924. Tensile test and resistivity requirements for untinned round wire.

Underwriters Laboratories. Heat Resisting Fixture Wire and Flexible Cord; 1929. For single conductor fixture wire and multiple conductor flexible cord, asbestos insulated type and cotton insulated type, limiting sizes, stranding of conductors, conductivity of copper, thickness and construction of insulation, carbon content of asbestos, adhesion, flexibility, dripping of compound, flame resisting properties, and dielectric strength test requirements.

Underwriters' Laboratories. Motion-Picture Cable and Stove Wire; 1921. Single copper conductors with asbestos covering for exposed leads in motion-picture machines, heaters, and stoves, but not suitable for moist places or use in conduit. Conductivity, limiting sizes of and stranding of conductors, thickness and carbon content of asbestos covering, flame and bend test requirements.

Underwriters' Laboratories. Rubber Covered Fixture Wires; 1927. Minimum sizes of conductors and strands, conductivity, tinning requirements, chemical, adhesion, and tensile test requirements for rubber, thickness of rubber, type and saturation of outer coverings.

Underwriters' Laboratories. Rubber Covered Wire; 1927. Copper conductors, permissible variations from standard sizes, conductivity, tinning requirements, adhesion and thickness of rubber, construction and number of tape or braid coverings, construction and dimensions of cables, thickness of lead coverings, voltage, insulation resistance, and wrapping test for wire, chemical and tension test requirements for rubber insulation.

Underwriters' Laboratories. Slow Burning and Slow Burning Weather proof Wires; 1920. Of soft copper, conductivity, number and thickness of cotton braid coverings, saturation requirements, flame proofing and heating test requirements.

Underwriters' Laboratories. Varnished Cloth Wires and Cables; 1928. Construction and thickness of varnished cotton cloth insulation, fibrous or lead outer covering same as for rubber covered wire, voltage and insulation resistance test requirements for wire, width, tensile strength, dielectric strength, and heat effect test requirements for the varnished cloth strips.

U. S. Gov., Federal Specifications Board 65; 1923. Rubber Covered Wires and Cables (For Ordinary Purposes). Wire sizes according to A. I. E. E. standards, dimensional tolerances, conductivity, splicing, and tinning requirements, adhesion requirements for rubber, construction of fibrous coverings, chemical and tensile test requirements for rubber, high voltage and insulation resistance test requirements for wire and cable, wrapping test for small single conductor insulated wires.

References.—Electric cables, electric cords. *See also* 715.41, 715.42. Iron and steel telephone and telegraph wire, resistance wire. *See* 715.43. Radio antenna. *See* 713.61. Copper bars, copper rods for wire drawing. *See* 641.11, 642.11. Terminology, rubber insulation, wire tables and gages. *See* also 715.40. Wiring methods and practice. *See also* 715.30. Definitions, symbols, methods of test, service standards, safety codes, for electrical apparatus. *See also* 710. Methods of testing and general requirements for metals. *See also* 641.0, 600.1. Methods of testing rubber goods. *See also* 200. Rubber insulation and tapes. *See also* 719.55. Insulating cloths and tapes. *See also* 719.56. Asbestos insulation. *See also* 719.51. Wires for Christmas tree lighting outfits. *See* 716.39.

715.49 Miscellaneous Wires, Cords, and Cables

U. S. Gov., Dept. of Commerce. Bureau of Standards R56–28; 1928. Carbon Brushes and Brush Shunts. For brush shunts, standard lengths, sizes, stranding, and size of terminal established as standard in simplified practice recommended and accepted by industry.

715.5 PROTECTIVE APPARATUS FOR ELECTRICAL EQUIPMENT

References.—Fuses, circuit breakers. *See* 714.21, 714.51.

715.50 General Items

American Railway Assn. Signal Section. Requisites for Choke Coils for Signaling; 1915. General requirements of operation and construction that the design of the choke coil will be required to meet.

American Railway Assn. Telegraph and Telephone Section. 4–8; 1924. Protector Mountings. Covers mountings for fuses and arresters, operating voltage, dielectric strength, and insulation resistance requirements, protection against ignition.

American Railway Assn. Telegraph and Telephone Section. 4–9; 1924. Protectors. Various combinations of protectors and protector mountings for fuses and arresters, shall meet the specifications of A. R. A. for the various fuses and arresters and for the mountings, except as to packing and marking.

Associated Factory Mutual Fire Insurance Companies. Lightning Rod Equipments on Smokestacks and Chimneys; 1929. Recommendations on minimum size and number of copper cable or tape, on supporting, protection against corrosion, on size, shape, and number of copper air terminals, on method of grounding.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Grounding. Grounding requirements for interior wiring circuits, metal inclosures, and electrical equipment, construction of grounds and permissible resistances, sizes, type and installation of ground wire and clamps and methods of grounding.

National Fire Protection Assn. Code for Protection Against Lightning; 1929. Based on Parts I and II of the Lightning Safety Code as published by Nat. Bureau of Standards and approved by American Standards Assn. and is identical therewith except for editorial and other minor differences.

Underwriters' Laboratories. Tentative Standard. Construction and Installation of Materials for Lightning Rod Equipments; 1925. Conductor materials of copper, alloys, copper clad steel, or galvanized steel, form and minimum weight of conductor, strength and resistance of joints, construction and mounting of fasteners and points, weight and stiffness of elevation rods, installation of elevation rods, location of air terminals, coursing of conductors, number of down conductors, interconnection of metallic masses, number, location, and construction of ground connections, rules applicable to special installations as metal roofed and metal clad buildings, spires, poles, water towers, smokestacks, chimneys, live stock in fields, trees, vessels and marine structures, balloons, airships, hangars, and oil tanks.

U. S. Gov., Dept. of Commerce, Bureau of Standards M92; 1929. Joint sponsor with American Institute of Electrical Engrs., approved by American Standards Assn., as C 5–1929. Code for Protection Against Lightning. For protection of buildings and miscellaneous property, fundamental principles of protection, materials for lightning rods, requirements on minimum sizes and weights of rods, strength and electrical resistance of joints, size and installation of elevation rods, coursing of conductors, number and location of down conductors, grounding, interconnection of metallic masses, recommendations on structural features of oil and gas tanks for self-protection against lightning.

U. S. Gov., Dept. of Commerce, Bureau of Standards M95; 1929. Protection of Electrical Circuits and Equipment Against Lightning. Preliminary report of committee working under auspices of American Standards Assn. presenting information about present methods and practices which have been found satisfactory, it indicates how and where lightning arresters should be installed at power houses, substations, transmission lines, railway lines, locomotives and car equipment, kinds of grounds and methods of testing.

References.—Slate insulation, porcelain insulation. *See also* 511.53, 532.22. Copper cable, wire, rods. *See also* 715.41, 715.44, 642.11. Other safety codes for electrical apparatus. *See* 710.

715.51 Lightning Arresters

American Institute of Electrical Engineers. Report on Standards No. 28; 1931. Standards for Lightning Arresters and Other Apparatus for Protection against Abnormal Transient Voltages. Definitions, classification, rating, performance, tests for protective and performance characteristics, dielectric test.

American Railway Assn. Signal Section. Requisites for Lighting Arresters for Signaling; 1915. General operating requirements that the design of the arrester will be required to meet.

American Railway Assn. Signal Section. 5215; 1915. Vacuum Gap Lightning Arresters. For signal circuits of 175 volts or less, temperature requirements on permanence of corrosion resistive coating, general design requirements for binding posts, insulating base, clearance of live parts, breakdown voltage and load discharge test requirements.

American Railway Assn. Signal Section 6031; 1931. Installation of Made Ground for Protection Against Abnormal Potentials. Ground elements of iron pipe or rod, or copper plate, size and material of ground lead, terminal pipe clamp, ground point, installation, materials according to A. R. A. specification 1424, location, proportions of charcoal, salt, etc., about element, maximum allowable resistance of ground.

American Railway Assn. Telegraph and Telephone Section. 4–4; 1924. Office Arresters for Telegraph and Telephone. Replaceable type to be used with line fuses, requirements on voltage operating characteristics, current carrying capacity, and insulation resistance.

American Railway Assn. Telegraph and Telephone Section. 4–5; 1924. Cable Arresters for Telegraph and Telephone. Replaceable type to be used with line fuses of more than 7 amperes, requirements on voltage operating characteristics current carrying capacity and insulation resistance.

References.—Lightning codes, lightning rod protection. *See* 715.50. Definitions, symbols, standard voltages, methods of test, safety codes. *See also* 710.

716. ELECTRIC LAMPS AND LIGHTING EQUIPMENT

716.0 GENERAL ITEMS

American Institute of Electrical Engineers. Standard No. 37; 1925. Illumination Engineering Society. American Standards Assn., Z 7–1925. Illuminating Engineering Nomenclature and Photometric Standards. Definitions referring to illumination in general, color nomenclature, diffusing and reflecting surfaces, illuminants, definition referring to photometry, tabulated photometric units and conversion factors. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society of Mechanical Engineers. Symbols for Photometry and Illumination. Approved by American Standards Assn. as Z10d–1930. Joint sponsors, Am. Assn. for Advancement of Science, Am. Inst. of Electrical Engineers, Society for Promotion of Engineering Education, and Am. Soc. Mech. Engineers. Comprises a revision of the symbols given in ASA standard Z7–1925 on Illuminating Engineering Nomenclature. Symbols and defining equations, adopted as standard, given for radiant flux, luminous flux, luminous intensity, illumination, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards T325; 1926. Recent Developments in Lamp Life-Testing Equipment and Methods. Describes the test methods and the construction and use of computing scales and other accessory equipment used in connection with bar and sphere photometers at the bureau for making photometric measurements on incandescent lamps while under life test.

716.1 ELECTRIC LAMPS

716.10 General Items

American Railway Assn. Electrical Section. XIII–a–30; 1930. Incandescent Lamp Standards. Standard watt and voltage ratings, standard bulb types and base types for general lighting service, for high voltage lighting service, for rough service, for limited lighting service, for sign lighting, floodlighting, train lighting, switch indicators, for use with resistor units, locomotive lighting, street lighting, electric street railway lighting, hand lantern service, flashlights, signal lamp, and motor coach lighting.

American Railway Assn. Mechanical Div. Recommended Practice. Schedule of Incandescent Lamps; 1930. Recommended types and sizes.

American Society of Mechanical Engineers. National Electrical Mfrs. Assn. Rolled Threads for Screw Shells of Electric Sockets and Lamp Bases. Approved by American Standards Assn. as C44–1931. For miniature, candelabra, intermediate, medium, and mogul types, standard pitch, dimensions, shape of threads, gage tolerances.

Assn. of Railway Electrical Engineers. 1929 Manual. E–II; 1928. Incandescent Lamp Standards. Types and sizes for various railway services.

U. S. Gov., National Screw Thread Commission. Publ. MS9 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. American National rolled threads for screw shells of electric sockets and lamp bases. Mandatory for material purchased and used by War and Navy Depts. Requirements on form of thread, threads per inch, and dimensions for miniature, candelabra, intermediate, medium, and mogul sizes, tolerances on threads and on inspection and working gages.

716.11 Ordinary Incandescent Lamps

American Railway Assn. Electrical Section. XIII–b–30; 1930. Large Tungsten Filament Incandescent Lamps. Requirements on general construction, initial rating test, life performance test, initial rating tolerances, with manufacturers' schedules of commercial ratings

American Railway Assn. Signal Section 5115; 1915. Incandescent Electric Lamps. Carbon and tungsten lamps for signal lights, dimensions, construction, candlepower and life test requirements, initial candlepower, wattage, and life requirements for 10-watt, 115-volt lamps, and for 5-watt, 12-volt lamps.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Incandescent Lamps. Limit of ratings for medium and mogul bases, protection requirements of gas filled lamps in show windows.

U. S. Gov., Federal Specifications Board. W–L–101; 1930. Large Electric Incandescent Lamps, Tungsten Filament. For 115 and 230 volt multiple circuits and for series street lighting circuits, with medium and mogul screw bases, requirements on overall length, light center length, hours life, rated watts and lumens and tolerances, methods of sampling and testing, rules for rejections.

References.—Illumination nomenclature, lamp testing methods. *See also* 716.0. Standard thread and screw base sizes, railway sizes and types. *See* 716.10. Definitions, symbols, standard voltages, safety codes. *See also* 710. Dial lamps for radio receivers. *See* 716.14.

716.12 Lamps for Automobiles and Motorboats

Illuminating Engineering Society, Society of Automotive Engineers. Approved by American Standards Assn. as D 2–1922. Published by I. E. S. and U. S. Dept. of Labor. Laboratory Tests for Approval of Electric Headlighting Devices for Motor Vehicles. Requirements on submission of samples, use of standard lamps, photometric test procedure, intensity of illumination at various points in the field.

Society of Automotive Engineers 1931 Handbook. Bases, Sockets, and Plugs; 1930. Includes standard dimensions of single and double contact bases for automobile lamps.

Society of Automotive Engineers 1931 Handbook. Electric Incandescent Lamps; 1928. Outside dimensions of lamps, location of filament and locking pin for four focusing type lamps, outside dimensions and location of locking pin for two nonfocusing lamps, two standard voltages, candlepower requirements for specified gas-filled head lamps.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Laboratory Tests of Optical Characteristics of Electric Signal Lamps for Motor Vehicles; 1931. Requirements on set-up for test, minimum luminous area of signal, light intensity of luminous area and at angle from signal.

Society of Automotive Engineers 1931 Handbook. Specifications for Laboratory Tests of Optical Characteristics of Electric Head Lamps for Motor Vehicles; 1930. Definitions, methods of test for measuring illumination, candlepower requirements for different points on measuring screen and for different focus adjustments, includes lower beam requirements for dual beam lamps.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Laboratory Tests of Optical Characteristics of Electric Signal Lamps for Motor Vehicles; 1930. Requirements on area and brightness of luminous signal area for red or amber stop signal indicator, methods of test.

Society of Automotive Engineers 1931 Handbook. Laboratory Tests of Optical Characteristics of Tail Lamps for Motor Vehicles; 1930. Candlepower requirements for the red light and illumination requirements for license plates, relative location of lamp and license plate.

Society for Automotive Engineers 1931 Handbook. Recommended Practice. Motorboat Electric Incandescent Lamps; 1930. Tables of dimensions of standard lamps for 6, 12, and 32 volts, for various candlepowers and wattage, covering bayonet base lamps and medium screw base lamps.

U. S. Gov., Federal Specifications Board W–L–111; 1930. Miniature Incandescent Electric Lamps, Tungsten Filament. For screw base flashlight lamps, and single contact and double contact bayonet base lamps for automobile service, trade numbers, voltage and current ratings, candle power ratings for automobile lamps, requirements on construction, overall lengths, light center lengths, and hours life, and for automobile lamps required maintenance of candlepower and initial watts rating per candlepower, tolerances, rules for rejection, methods of sampling and testing.

References.—Illumination nomenclature, lamp testing methods. *See also* 716.0. Standard thread and base for screw base lamps. *See also* 716.10.

716.13 Electric Hand Lamps and Lanterns

U. S. Gov., Dept. of Commerce, Bureau of Mines. Schedule 10A, 1922. Procedure for Establishing a List of Permissible Electric Hand Lamps, Trip Lamps, Animal Lamps, and Rescue Lamps for Use in Gaseous Mines. Requirements on locking of battery, on provision of safety device for broken bulb, short circuit capacity of battery, tests of extinguishing feature of safety device for broken bulb, scope of approval, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards R68; 1927. Metal and Fiber Flash-Light Cases. Simplified practice recommended and accepted by industry establishing a limited list of standard stock types, sizes, and finishes for cases for 2-cell and 3-cell flash lights.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Flash Lights and Batteries. As life boat equipment on ocean and lake vessels, for an all-metal flash light, mandatory requirements on diameter of reflector head, shape and coating of reflector, for 3 cell in line dry batteries, general construction of sal ammoniac type batteries.

U. S. Gov., Federal Specifications Board W–L–111; 1930. Miniature Incandescent Electric Lamps, Tungsten Filament. For screw base flashlight lamps, trade numbers, voltage and current ratings, requirements on construction, overall lengths, light center lengths, and hours life, tolerances, rules for rejection, methods of sampling and testing.

References.—Miner's lamps. *See* 716.17. Illumination nomenclature, lamp-testing methods. *See also* 716.0. Standard thread and base for screw base lamps. *See also* 716.10. Flash-light batteries. *See* 712.1. Dial lamp for radio receivers. *See* 716.14.

716.14 Dial Illuminating Lamps

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 322–616. Pilot Lamp for Radio Receiver. Dimensions of standard base and lamp using standard miniature size of Edison type screw shell, standard ratings for lamps for 5-volt and for 2½-volt circuits.

Radio Manufacturers Assn. (Inc.). M4–122 to M4–126, incl.; 1930. Dial Lamps. For standard miniature screw base lamp, requirements on dimensions of base and of lamp, rating of lamps for use on 5-volt circuits and for lamps for use on 2.5-volt circuits.

References.—Illumination nomenclature, lamp testing methods. *See also* 716.0. Standard thread and base for screw base lamps. *See also* 716.10.

716.15 Mercury Vapor Lamps

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Mercury Vapor Lamps. Requirements for grounding, overload protection, and enclosures for resistances and regulators.

716.16 Arc Lamps

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Arc Lamps. Enclosure, clearance and mounting requirements of parts, requirements on leads, overload protection, and operating switch.

Underwriters Laboratories. Therapeutic Carbon Arc Lamps; 1930. Requirements on stability, thickness of metal inclosure, design features of inclosure, carbon holders, and screens, insulation of wiring, provision of terminals, spacing of live parts, test of lamp insulation, test of current interrupting device, permissible heating, etc.

References.—Illumination nomenclature. *See* 716.0 Definitions, symbols, methods of test, electric service standards, safety codes. *See also* 710. Arc projectors and searchlights. *See* 716.2.

716.17 Miner's Lamps and Gas Detectors

U. S. Gov., Dept. of Commerce, Bureau of Mines Schedule 6B; 1926. Permissible Electric Cap Lamps. Requirements on angle of light beam, on light distribution, on explosion safety device at lamp and at battery, on nonspillability of battery liquid, on time of burning and candle power, on one battery charge, on bulb life, bulb uniformity, prevention of corrosion, etc., how approval is granted.

U. S. Gov., Dept. of Commerce, Bureau of Mines Schedule 8B; 1926. Portable Methane Detectors. Requirements on safety against ignitions when used in gaseous mines, on general construction of seals, glasses, battery, nonspillability of electrolyte, on tests for sensitivity of detection of methane, on accuracy and range of indicating detectors, on drop test for mechanical strength, how approvals are granted.

References.—Illumination nomenclature, lamp testing methods. *See also* 716.0. Standard thread and screw base sizes. *See* 716.10. Flame type miners lamp. *See* 997.6.

716.2 SEARCHLIGHTS, PROJECTORS, LOCOMOTIVE HEADLIGHTS

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Searchlights. Recommendations on provision of glass mirrors of mangin or parabolic type, protection of mirror and exclusion of moisture, simplicity of operating gear, mounting and sturdiness of resistors, location of searchlight on ship.

American Railway Assn. Mechanical Div. Recommended Practice. For electric headlight, requirements on spacing and size of bolt holes in mounting base, method of photometry and of physical measurement of reflectors, provision of dimmer.

American Railway Assn. Mechanical Div. Recommended Practice. Dimensioning of Headlight Reflectors; 1924. Recommendations on points of origin from which the dimensions of glass reflectors should be taken, standard dimensions illustrated.

Assn. of Railway Electrical Engineers. 1929 Manual. B–II; 1928. Headlight Cases. For locomotive electrical equipment, dimensions and spacing of bolt holes in base of headlight case.

Assn. of Railway Electrical Engineers. 1929 Manual. B–III; 1928. Headlight Reflectors. For locomotive electric headlight, methods of dimensioning metal reflectors and glass reflectors with a few tolerances.

U. S. Gov., Dept. of Commerce, Bureau of Mines. Schedule 2C; 1930. Explosion Proof Mine Equipment. Headlights. Requirements for approval for use in gassy and dusty mines, including requirements for machine and locomotive headlights for provision of explosion proof casings, for thickness of casing walls and headlight glass, construction and bolting of casing joints, explosion tests, etc.

References.—Motion-picture projectors. *See* 912.

716.3 LIGHTING REQUIREMENTS AND EQUIPMENT

716.30 General Items

American Electric Railway Engr. Assn. Recommended Practice E122–30; 1930. Shop, Office and Yard Lighting. Properties of multiple and arc resisting series incandescent lamps, of reflectors and lighting units, recommendations on type of lighting and the minimum intensity for the different applications in shop, office and yard.

American Institute of Architects. Code of Lighting School Buildings. See Illuminating Engineering Society.

American Society of Mechanical Engineers. Symbols for Photometry and Illumination. Approved by American Standards Assn. as Z10d–1930. Joint sponsors, Am. Assn. for Advancement of Science, Am. Inst. of Electrical Engrs., Society for Promotion of Engineering Education, and Am. Soc. Mech. Engineers. Comprises a revision of the symbols given in ASA standard Z 7–1925 on Illuminating Engineering Nomenclature. Symbols and defining equation, adopted as standard, given for radiant flux, luminous flux, luminous intensity, illumination, etc.

Artistic Lighting Equipment Assn., Assn. of Edison Illuminating Companies, Illuminating Engineering Society, and National Electric Light Assn. Appendix A. Specifications for Residence Lighting Equipment; 1928. Luminaires are appraised by use of a numerical system of relative weights for the several stipulated qualities, specifications and tests for arriving at the number to be assigned and limiting values for certain of the qualities. Covers illumination qualities as regards illuminating power, light distribution, and freedom from glare; construction and finish; and appearance.

Assn. of Railway Electrical Engineers. 1929 Manual. E–I; 1928. Manual of Lighting Practice for Railroads. Fundamentals of illumination and general design data, recommended practice for lighting of railway shop and roundhouse, office and drafting room, passenger and freight station, storehouse, warehouse, pier, yard, car, including specifications of Post Office Dept. for lighting of mail cars.

Illuminating Engineering Society. Approved by American Standards Assn. as A 11–1930. Published by I. E. S. and U. S. Dept. of Labor, Code of Lighting Factories, Mills and Other Work Places. Requirements on minimum foot-candles illumination for various work spaces, avoidance of glare, diffusion and distribution of light, exit, and emergency lighting, information on good lighting practice, classification of light sources from standpoint of glare, etc. Work going forward looking toward revision of this code.

Illuminating Engineering Society. American Institute of Architects. Approved by American Standards Assn. as A 23–1924. Published by I. E. S. and U. S. Dept. of Labor. Code of Lighting School Buildings. Requirements on minimum and recommended values of illumination for various rooms and grounds of school buildings, avoidance of glare, distribution of artificial light, color and finish of interior, exit and emergency lighting.

Illuminating Engineering Society. Approved by American Standards Assn. as Z 7–1925. Illuminating Engineering Nomenclature and Photometric Standards. Definitions of lumen, candle power, lux, phot, lambert, relative visibility factor, hue and color saturation, types of reflecting surfaces, illuminants, photometric units and abbreviations, etc.

Society for Electrical Development (Inc.). Franklin Specification for Good Lighting; 1929. For factory, office, store, and public building, includes tables of recommended and of minimum intensity of illumination for many types of industrial and commercial interiors, and tables for determining the size and spacing of lamps for various types of lighting equipments, room and maintenance conditions, and desired intensity of illumination. Recommendations on wiring included.

References.—Wiring methods and practice. *See* 715.30.

716.31 Electric Signs

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn. C1–1931. Signs and Outline Lighting. Minimum thickness of sheet metal, provisions for drainage, weather proof cabinets, switches, and fuses, types of sockets and receptacles, minimum size and insulation of wire, method of installing wire, capacity of branch circuits, inclosure of live parts, and grounding requirements.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Vacuum and Inert Gas Tube Systems of over 600 volts. Support of tube, protective mounting of terminals, protection of transformers and tubes, maximum voltage of transformer secondary, minimum size, insulation, and insulation of conductors, overload protection requirements.

Underwriters Laboratories. Electric Signs; 1930. Covers incandescent lamp and gas tube signs, requirements on thickness of metal in body parts, on structural features, thickness of glass and of fastenings for glass panels and letters, wiring requirements, permissible current carrying capacities, spacing of wires, enclosure of transformers, insulation of cable and tube supports, dielectric strength, etc.

References.—Wiring methods and practice. *See also* 715.30. Safety code for signs. *See* 710. Copper wire, electric lamps. *See also* 715.44, 716.11. Steel sheets. *See also* 604.23. Transformers, high frequency apparatus. *See also* 713.5, 717.3.

716.32 Electric Lighting Fixtures

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practice for Electrical Installations on Shipboard. Permanent Watertight Fixtures. For outside lighting fixtures, recommended requirements on permissible temperature rise of fixture, provision of watertight globe and of guard about lamp, threading for 2 sizes of globes and of base of fixture.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Fixtures, Construction of lighting fixtures, wireways, thickness of metal tubing, minimum size of wire, method of wiring, grounding, mounting requirements for various locations.

Underwriters' Laboratories. Electric Fixtures; 1928. Minimum thickness of tubing walls, threaded and locked joint construction, electrical assembly, construction of wire ways, minimum size and current-carrying capacity of wire, wire insulation, wiring methods, electrical tests of wiring, operating temperature requirements.

Underwriters' Laboratories. Insulating Joints and Studs; 1920. Intended for use in insulating straight electric and combination gas and electric fixtures from grounded metal work. Metal materials of malleable iron, steel or brass, general design, finish, and threading, test requirements for softening of insulating material, torsion strength of joint, bending, leakage, and dielectric strength.

References.—Wiring methods and practice. *See also* 715.30. Safety codes, symbols, testing methods. *See also* 710. Molded insulation. *See also* 719.58. Sockets and receptacles. *See also* 715.21. Copper wire, gas fixtures. *See* 715.44, 997.2.

716.39 Miscellaneous Lighting Equipments

American Electric Railway Engr. Assn. Recommended Practice E121–30; 1930. Car Lighting. Recommends a minimum intensity of illumination, general type of lighting, location of lights in car and at entrances and exits, gives characteristics of lamps and reflectors, drawings of car lighting layouts.

American Electric Railway Engr. Assn. Recommended Practice E123–30; 1930. Motor Coach Lighting. Recommendations of minimum illumination intensity, sizes of lamps for various locations and uses, data on representative lamps and reflectors, typical layouts that give recommended illumination intensities, recommended types and construction for headlights and rules for adjustment, construction and illumination of signs, types of step lights and stop lights, total recommended wattage requirements for various sizes of motor coaches, sizes of wire.

American Railway Assn. Mechanical Div. Recommended Practice. Car Lighting; 1927. Standard voltages, recommendations on mounting and clearance of axle generator, or dimensions and design of generator pulleys, battery boxes, charging receptacle and plug, train-line receptacle and connectors, mountings for link fuses, open end link fuses, recommended material on switchboard, installation of wiring and conduit, wire according to specifications of Assn. of Railway Electrical Engrs.

American Railway Assn. Mechanical Div. Recommended Practice. Locomotive Lighting; 1927. Requirements on system voltage, capacity, range of operation, and mounting of turbo-generator, mounting of electric headlight.

Assn. of Railway Electrical Engineers 1929 Manual. Electric Train Lighting; 1928. Requirements for system voltages, mounting clearances, and specifications for axle generator, dimensions and design of pulleys, pulley bushings, battery boxes, charging receptacles and plug, train line connector, installation of conduit and wire, connecting and fusing of wire; specifications for generator regulator and lamp regulator.

Underwriters Laboratories. Christmas Tree and Decorative Lighting Outfits; 1931. For series type with miniature base lamp holders and for parallel type with intermediate and medium base lamp holders, for indoor and outdoor use, requirements on voltage and current ratings, type, insulation, and minimum sizes of wire, depth and heat softening test for lamp holders, connections, strain relief, etc.

References.—Lighting codes, illumination nomenclature. *See also* 716.30. Electric lamps. *See* 716.1. Wiring methods and practice, safety code. *See* 715.30, 710.

717. HOUSEHOLD DEVICES, HEATERS, AND X-RAY APPARATUS

717.0 GENERAL ITEMS

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Electrical Appliances for domestic and commercial use. Branch circuit requirements for various capacity appliances, application and location of disconnecting switch, construction requirements for plug connector on portable appliances, approved types of cords for portables, fuse requirements for circuits.

717.1 ELECTRIC HEATING AND COOKING DEVICES

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Electric Heaters. For convector and radiant type, recommended standard voltages and sizes, number of heat ranges for various sizes, material and structural features of framework and protective guards, protection against corrosion, noncorrodibility and ease of removal of heater units, permissible temperature rise of inclosing cases or adjacent deck or bulkhead.

Underwriters' Laboratories. Domestic Electric Ranges; 1930. Thickness of sheet metal casings and linings, permissible application of rubber insulated and of asbestos insulated wire, installation of wire, high-voltage test of wiring, general requirements on installation of terminal box, terminals, cut-out bases, receptacles, switches, and grounding, operating temperature effects permissible on nearby surfaces and in terminal boxes, rating requirements.

Underwriters' Laboratories. Electric Car Heaters; 1925. Classification of stationary heaters, requirements on protection of heating elements, wiring, and terminals, test requirements on heating effects on adjacent materials, on dielectric strength, and on overload.

Underwriters' Laboratories (Inc.). Electrically Heated Appliances; 1930. Requirements on stiffness of sheet metal for frames or inclosures, stability of device, support and protection of heating element, permissible insulation materials for wiring for various temperatures encountered, use of fusible links, use and types of terminals, voltage test for insulation, types of switches, receptacles, cords, and plugs required, temperature tests, permissible current leakage for liquid heating appliances, etc.

U. S. Gov., Federal Specifications Board 68a; 1925. Sterilizers, Dressing Containers, Etc. Electric heaters for sterilizers, requirements on 3 heat control, tolerance on rated capacity, type of switch, dielectric test of insulation, freedom from oxidization, etc.

References.—Resistant heater wire. *See also* 715.43. Heater cord. *See also* 715.42. Plugs, connectors, snap switches. *See also* 715.21, 717.0, 715.22. Insulated wire. *See also* 715.44. Wiring for heaters. *See* 717.0. Steel sheets. *See also* 604.22, 604.23. Zinc and nickel plating. *See also* 600.3.

717.2 MOTOR-DRIVEN HOUSEHOLD DEVICES

References.—Electric fans. *See* 711.23.

717.3 X-RAY APPARATUS AND EQUIPMENT

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. X-Ray and High Frequency Apparatus. Requirements for barriers or separate inclosures, insulation and location of operating handles, high voltage leads, and tube terminals, requirements for circuit breaker and automatic switch in transformer circuit, grounding.

U. S. Gov., Dept. of Commerce, Bureau of Standards RP56; 1929. The Precise Measurement of X-Ray Dosage. Includes a definition of the international unit of X radiation, describes the equipment at the Bureau of Standards and the method of use in the standard measurement of X-ray dosage.

U. S. Gov., Dept. of Commerce, Bureau of Standards RP211; 1930. An Improved Form of Standard Ionization Chamber. Describes a modification of the open-air parallel plate ionization chamber that is portable and is used in the measurement of X-ray intensity. Measurements are as accurate as those made with the primary standard described in RP56.

References.—Use of cathode ray oscillograph. *See* 718.65.

718. TELEPHONE, TELEGRAPH, RADIO, AND SIGNAL APPARATUS

718.0 GENERAL ITEMS

American Institute of Electrical Engineers. Standard No. 17g6; 1929. Graphical Symbols for Telephone and Telegraph Use. Approved by American Standards Assn. as Z10g6–1929. Standard symbols for use in wiring diagrams, etc.

American Institute of Electrical Engineers. Standard No. 34; 1922. Telephony and Telegraphy. Definitions concerning line circuits, equivalent circuits, telephony, telegraphy.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Signal Systems. Telephone, telegraph, messenger and call bell circuits, fire and burglar alarms. Insulation and separation from light and power wires, spacing on cross arms, permissible kinds of insulation for aerial cables, thickness of rubber on wire entering building, requirements for arresters, fuses, grounding, and size of grounding wire for aerial wires.

References.—Ground clamps. *See* 719.72.

718.1 TELEGRAPH APPARATUS

References.—Engine telegraphs for ships. *See* 718.39. Definitions of circuits, standard symbols, wiring requirements. *See* 718.0. Telegraph table, dispatchers table. *See* 613.6.

718.11 Telegraph Instruments

718.12 Telegraph Keys

718.2 TELEPHONE APPARATUS

718.20 General Items

American Railway Assn. Telegraph and Telephone Section. 11–4; 1926. Standardization of Transmission Unit. Defines transmission unit, describes its application and compares it with previous unit of "mile of standard cable."

718.21 Telephone Instruments

U. S. Gov., Dept. of Commerce, Bureau of Mines Schedule 9A; 1922. Procedure for Establishing a List of Permissible Telephones for Use in Coal Mines. Requirements on housing of magneto, hook switch batteries, etc., in explosion proof compartments, construction of joints in casings, short circuit capacity of battery, tests for explosion safety in explosive gases, scope of approval, etc.

References.—Telephone head set for radio. *See* 718.69. Safety code for telephone apparatus exposed to electric supply lines. *See* 710.

718.22 Telephone Switchboards

American Railway Assn. Telegraph and Telephone Section. 2–G–9; 1924. Porcelain Jack Panel ARA–4–B. Panel for mounting 16 jacks on switchboard frame, insulation resistance test and absorption of water test requirements for porcelain panel, color of glaze, dimensions.

American Railway Assn. Telegraph and Telephone Section. 2–G–37; 1928. Molded Composition Jack Panel ARA–4–C. Made of molded homogeneous black composition, dimensions, insulation resistance test requirements.

American Railway Assn. Telegraph and Telephone Section. 2–G–46; 1929. Switchboard Framework, ARA–2–F. For telegraph and telephone switchboard, list of tees, angles, straps, braces, bolts, etc., comprising the assembly, requirements on fillet sizes of angles and tees, on size of tapped holes, dimensions and design of assembled framework and of detail parts.

References.—Porcelain for electrical purposes. *See also* 532.22. Slate for electrical purposes. *See* 511.53. Molded insulation. *See also* 719.58. Symbols, methods of testing, safety codes. *See also* 710. Switchboard equipment. *See also* 718.29.

718.29 Miscellaneous Telephone Equipment

American Railway Assn. Telegraph and Telephone Section. 2–G–7; 1924. Block Mountings. Sheet steel mountings for terminal or fuse blocks in cabinets, annealing requirements for steel, dimensions of one size of mounting.

American Railway Assn. Telegraph and Telephone Section. 2–G–8; 1924. Terminal Block ARA–2–C. Terminal block for 10 wires, general quality and absorption test requirements for porcelain base, dimensions of brass terminal punchings and screws, dimensions of assembled terminal board, tinning requirements.

American Railway Assn. Telegraph and Telephone Section. 2–G–10; 1924. Jack ARA–200–A. Detail dimensions of each part, composition of brass for body of jack, composition and hardness requirements of german silver contacts, test requirements on dimensions, assembly clearances, and force required to force in plug.

American Railway Assn. Telegraph and Telephone Section. 2–G–12; 1924. Single Conductor Plug ARA–1–A. For use in connection with patching cords on pin jack switchboards, detailed dimensions of brass body, fiber sleeve, screws, and test gage.

American Railway Assn. Telegraph and Telephone Section. 2–G–13; 1924. Designation Card Holder ARA–34–A. For use in connection with porcelain jack panel ARA–4–B, dimensions of sheet brass blank and of finished holder, enameling requirements.

American Railway Assn. Telegraph and Telephone Section. 2–G–14; 1924. Porcelain Filler Button ARA–3–A. For use with porcelain jack panel ARA–4–B, general quality and water absorption test requirements, dimensions.

American Railway Assn. Telegraph and Telephone Section. 2–G–17; 1925. Jack ARA–202–A. For use in switchboards, body of cast brass, contacts of german silver, insulation pieces of mica or micanite, composition and hardness requirements for german silver, composition and hardness requirements of rolled brass parts, detailed dimensions of parts, test requirements for dimensions, assembled clearances and force to operate contacts and insert plug.

American Railway Assn. Telegraph and Telephone Section. 2–G–27; 1927. Double Conductor Plug ARA–3–B. For use with cords on pin jack switchboards, body of brass with inner steel rod insulated with hard rubber, construction, detail dimensions of parts and test gage.

American Railway Assn. Telegraph and Telephone Section. 2–G–35; 1928, and 2–G–36; 1928. Jacks ARA–221–A and ARA–228–A. Body of cast brass, contacts of german silver, composition of brass and German silver, detail dimensions of parts, test requirements for electrical breakdown, contact operation and clearances of assembled jack, and force to push in plug, for jacks insulated with mica.

American Railway Assn. Telegraph and Telephone Section. 2–G–41; 1928. Dummy Plug ARA–165–A. For use on switchboards and test panels, dimensions of maple plug.

American Railway Assn. Telegraph and Telephone Section. 2–G–47; 1929. Distributing Frame ARA–1–A. For angle-iron framework, requirement on design and dimensions of assembled unit and of detail parts, enamel finish, list of parts for one unit.

American Railway Assn. Telegraph and Telephone Section. 2–G–48; 1929. Wall Distributing Frame ARA–4–A. For angle-iron frame, requirements on design and dimensions of assembled unit and of detail parts, enamel finish, list of parts for one unit.

U. S. Gov., Federal Specifications Board. W–W–101; 1931. Watchman's Report Apparatus. Includes telephone jack and plug, for jack requirements on material of spring, minimum pressure between spring and plug and between contacts when plug is inserted. For plug, requirements on minimum diameter and maximum length, protection against short circuit and exposure of live parts when inserted.

References.—Structural steel shapes. *See also* 605.12, 605.14. Plugs and jacks for radio apparatus. *See* 718.69. Porcelain for electrical purposes. *See also* 532.22. Switchboard cords. *See* 715.42. Standard symbols, definitions of circuits. *See also* 718.40.

718.3 SIGNAL DEVICES, OTHER THAN RAILWAY AND HIGHWAY SIGNALS

718.30 General Items

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Signal Systems. Includes fire and burglar alarms, requirements on insulation and separation from light and power wires, spacing on cross arms, permissible kinds of insulation for aerial cables, thickness of rubber on wire entering building, requirements for arresters, fuses, and grounding.

National Board of Fire Underwriters. Protective Signaling Systems; 1931. For fire alarm, except municipal fire alarms, and for watchmen's signals, size and insulation of underground and aerial wires, requirements for storage batteries, chargers, and motor generators, for electric power service and primary battery sources, trouble signal requirements, circuit arrangements, equipment, tests, operation for various types of fire alarm, watch service, supervision circuits, of manual and automatic types.

718.31 Burglar Alarms

Underwriters' Laboratories. Bank Vault Local Burglar Alarm Systems; 1923. Applies to systems used to signal by means of outside sounding device, if entrance is attempted through protection provided. Requirements on maintenance, range of sounding device, continuance of signal, installation, and type of circuit. Rating of systems according to practicability, durability, reliability, resistance to defeat, fire hazard, uniformity, and workmanship.

Underwriters' Laboratories. Central Office Burglar Alarm Systems on Mercantile Establishments, Vaults, Safes, and Bank Vaults; 1929. Direct wire systems, requirements on protection of central office, provision of and installation of duplicate storage batteries and charging equipment, operation requirements for protection circuits, minimum strength and resistance of overhead wires, requirements for operating and guard forces and their equipment, procedure for answering alarms. For transmitter systems, connection, operation, types of circuit, and installation. Rules for classification of alarm systems.

Underwriters' Laboratories. Local Mercantile Burglar Alarm Systems; 1928. Alarm systems of outside gong type, insulation and minimum size of wire, installation, operation, and protection of operating circuit, electrical apparatus and batteries, alarm housing, and cabinets, type of protection circuit, dielectric strength of relay coils, gauge of sheet metal in housings, rules for classification.

U. S. Gov., Federal Specifications Board. W–W–101; 1931. Watchmen's Report Apparatus. For a battery operated system for registering at a central office through visible and audible means each report of a watchman, for making a permanent record of the time of each report, and for providing telephone communication between local and central station. Requirements on construction and location of report station boxes and telephone jacks, material of jack springs, and pressure to operate, type and length of plugging in cord, dimensions and construction of plug, minimum size of wire for wiring between stations, equipment to be provided at central office, general requirements on construction and accuracy of register, dielectric test of signal circuit and attached mechanism, type and operating features of annunciator, operating features of system.

References.—Burglar alarm systems. *See also* 718.30. Alarm bells. *See also* 718.33. Cables and insulated wire. *See also* 715.41, 715.44.

718.32 Fire Alarms

National Board of Fire Underwriters. Municipal Fire Alarm Systems; 1926. Insulation, protection, construction, minimum sizes of conductors and installation requirements for underground and aerial cable and of inside wiring, requirements for fuses and arresters, sources of current supply, capacity of storage batteries and installation requirements, construction and operating characteristics of alarm boxes, protector boards, switchboards, testing, visual indicating, recording, and sounding device requirements, types of circuits provided, and system test requirements.

U. S. Gov., Federal Specifications Board W–F–391; 1930. Hand Operated Electric Fire Alarm Systems. For a battery operated, presignal, positive noninterfering, code type, manual fire-alarm system using electromechanical signal gongs, requirements on operating features of system, on operating features, materials, and finish for punch register, take-up reel, gongs, gear trains, cabinets, etc., types and materials of inclosures and panels, high voltage test of insulation, etc.

References.—Fire alarm system. *See also* 718.30. Alarm bells. *See also* 718.33. Cables and insulated wire. *See also* 715.41, 715.44. Watchmen's report apparatus. *See* 718.31.

718.33 Bells, Buzzers, and Push Buttons

American Railway Assn. Signal Section 4427; 1927. Direct Current Vibrating Highway Crossing Bell. 12-inch diameter, gong type for 8-volt operation, general construction requirements, permissible variation in coil resistance, electric surface leakage distance, high voltage and operation at reduced voltage test requirements.

Underwriters' Laboratories. Electric Bells; 1925. For general uses and for fire alarm systems, inclosed type, requirements for noncombustible materials, corrosion prevention, thickness of metal cover, method of mounting, connections, operating and dielectric strength test requirements, operation test at reduced current.

References.—Methods of testing, safety codes. *See also* 710. Zinc and nickel plating. *See also* 600.3. Insulated wire. *See* 715.44. Bell ringing transformers. *See* 713.5.

718.34 Sirens

718.35 Time-Clock Systems

U. S. Gov., Federal Specifications Board W–T–411; 1930. Electric Time-Clock Systems. For 4 types, a battery or motor operated, minute impulse master and secondary clock system, for clocks operated from synchronous motors, for a self-winding, hourly corrected clock system, and for a combination system, requirements on operating features, structural features, materials for cases, movements, dials, pendulums, relays, etc., accuracy of regulation, etc.

718.39 Miscellaneous Signal Devices

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Telegraphs, Mechanical and Electrical. Recommended requirements on accuracy and permanence of indication for engine telegraphs, provision of audible signal, number and type of indications, visibility, illumination of dials, sizes of pulleys and wire for mechanical telegraph, noncorrodible qualities of materials, installation rules.

References.—Noncorrosive coatings for metals. *See also* 600.3. Aircraft signals and signal equipment. *See* 724.3.

718.4 RAILWAY SIGNAL AND TRACK CONTROL EQUIPMENT

718.40 General Items

American Electric Railway Engr. Assn. S1–25; 1925. Standard Use of Semaphore Signals. Arranged to indicate two or three positions in upper left-hand quadrant.

American Electric Railway Engr. Assn. S2–25; 1925. Standard Fundamental Indications in Signaling. Five indications for signals controlled by track circuits.

American Electric Railway Engr. Assn. S3–25; 1925. Standard Aspects in Three-Position Signaling. Chart showing aspects for color light signals and for semaphore signals.

American Electric Railway Engr. Assn. S6–16; 1916. Standard Clearance Diagrams for Semaphore Signals. Two diagrams for steam road equipment operated over electric lines, one where trainmen are not allowed to climb side or ride on top of cars, and one where they are allowed.

American Electric Railway Engr. Assn. Recommended Practice. S101–25; 1925. Aspects for Two-Position Signaling. Chart showing recommended aspects for color light signals and for semaphore signals.

American Electric Railway Engr. Assn. Recommended Practice. S102–25; 1925. Use of Continuous Track Circuits for the Control of Automatic Signals for Interurban Service. Above is recommended where complete protection is required.

American Electric Railway Engr. Assn. Recommended Practice; S103–25; 1925. Methods Of Signalling Double Track Railways Employing Track Circuit Controlled Signals. Signals operated in the train occupied block and in blocks to rear of train.

American Electric Railway Engr. Assn. Recommended Practice. S104–25; 1925. Methods of Signaling Single Track Railways Employing Track Circuit Controlled Signals. Operation of signals in blocks ahead of train and in blocks to rear of train with the addition of direction indicators where operation is controlled entirely by signal indication.

American Institute of Electrical Engrs. Report on Standard 17g5. Joint sponsor with American Assn. for Advancement of Science, American Society of Civil Engineers, Society for Promotion of Engineering Education, and American Society of Mechanical Engineers under procedure of American Standards Assn. Graphical Symbols used for Electric Traction Including Railway Signalling. Committee report on symbols, including symbols for railway signalling.

American Railway Assn. Operating Division. The Standard Code of A. R. A.; 1928. Train Rules, Block Signal Rules, Interlocking Rules.

American Railway Assn. Signal Section. Application of Signals; 1929. A. R. A. code rules for indications for various signal aspects for typical semaphore and equivalent color light, position light, or color position light signals, location and application.

American Railway Assn. Signal Section. Maintaining and Testing Motor Semaphore Signals; 1930. Instructions applicable to installed equipment.

American Railway Assn. Signal Section. Technical Terms Used In Signaling; 1930. Definitions of terms and abbreviations.

American Railway Assn. Signal Section. Take Siding Indicator and Leave Siding Indicator; 1930. The aspect for order to take siding or leave siding to be display of letter " S," requirements on location of indicator and visibility distance.

American Railway Assn. Signal Section. Maintaining and Testing Light Signals; 1930. Instructions.

American Railway Assn. Signal Section. Circuit Nomenclature and Written Circuits; 1914. Abbreviated designations for electrical signaling units, track circuit numbering, wire nomenclature, symbols for written circuits, abridged and simplified signal circuit diagrams.

American Railway Assn. Signal Section. Minimizing the Effect of Lightning on Direct Current Track Circuits; 1927. Construction of resistors and connections on relays for minimizing lightning damage.

American Railway Assn. Signal Section. 11929; 1929. Wiring. Installation of wires and cables in interlocking plants, classification yard plants, block signals, and highway crossing signals, both underground and on poles, details of branch connections, references to A. R. A. specifications for grounding and parkway cable.

American Railway Assn. Signal Section. Requisites for Light Signals for Day and Night Indications; 1921. Range, disallowance of phantom signals, and spread requirements.

718.41 Railway Signals

American Railway Assn. Signal Section. Highway Crossing Signals; 1931. To give aspect of swinging red light, height, spacing, flash frequency, range and spread for flashing light type; size and transmission values of lenses and roundels; length and frequency of stroke, size of disc for wig-wag type.

American Railway Assn. Signal Section. Train Approach Signals; 1929. Approves recommendation 67 in 1929 report of the Committee of American Engineering Council on Street Traffic Signs, Signals and Markings for two types of signals at grade crossings, the swinging target and red light, and the two alternately flashing red lights spaced 30 inches horizontally.

American Railway Assn. Signal Section. Direct Current Automatic Block Signaling Circuits; 1922. General design and installation requirements, specific control indications required for specified conditions.

American Railway Assn. Signal Section. Switch Indicators; 1930. Their use as adjuncts to automatic block signal system, preferred locations, installation.

American Railway Assn. Signal Section 2029; 1929. Direct-Current Semaphore Signal. Dimensions and design of signal mast, bases, bracket posts, ladders, semaphore spectacle, lamps, lamp brackets, roundels and blades, design requirements for mechanism, mechanism case, bearings, shafts, motor, hold clear device, etc., insulation, surface leakage distance, tests for dielectric strength and excess voltage.

American Railway Assn. Signal Section 6329; 1929. Direct-Current Automatic Block Signals. Allowable voltage drop in feeders, types of apparatus, materials and apparatus specified by reference to A. R. A. specifications, insulation requirements for pipe and switch fittings, dimensions of signal masts, bracket posts, bases, foundations, ladders, etc., wiring and some construction requirements.

American Railway Assn. Signal Section 7919; 1920. Alternating Current Motor Semaphore Signal. General design requirements for housing, operating connection, bearings, etc., design and operating requirements for motor and hold-clear device, insulation and surface leakage distance, test requirements for dielectric strength, current for motor and hold-clear device, time to clear signal, clearances.

American Railway Assn. Signal Section 8029; 1929. Electric Color Light Signal. General design requirements for case, references to A. R. A. specifications for lenses, roundels, electric lamps, and transformers, wiring and dielectric strength test requirements, blanks for other items for filling in by purchaser.

American Railway Assn. Signal Section 8119; 1920. Electric Position Light Signal. Some general design requirements for high signal and for dwarf signals, for cover glass, background and hood.

American Railway Assn. Signal Section 8620; 1921. Alternating-Current Automatic Block Signal System. Allowable voltage drop in feeders, accuracy of voltage ratings of transformers, minimum sizes of wire, materials and apparatus specified by reference to A. R. A. specifications, some constructional requirements.

American Railway Assn. Signal Section 9720; 1921. Alternating-Current Indicator or Repeater. General design requirements for parts and contacts, surface leakage distance, test requirements for dielectric strength, clearance of moving parts, voltage to pick up contacts and to drop away contacts, and operation on reduced voltage.

American Railway Assn. Signal Section 10020; 1921. Direct-Current Motor Operated First Range Voltage High Signal Mechanism. General design requirements, shaft torques, construction of case, design requirements for operating connections, bearings, hold clear device, and circuit controller, load requirements of motor, operation of motor and hold-clear device on reduced voltages, surface leakage distances, dielectric test requirements for electrical apparatus.

American Railway Assn. Signal Section 13123; 1923. Direct-Current Indicator. Apparatus to indicate visually by semaphore, disc, or light the approach of a train or occupancy of a section of track, general design requirements for armature and armature bearings, air gap adjustment, mounting and insulation of coils, permissible variation in resistance and winding, drop-away and pick-up values, surface leakage distance, and dielectric strength test requirements.

American Railway Engineering Assn. and Manganese Track Society. A. R. E. A. Trackwork Plans; 1930. Switch Stands. Standard heights, general design and operating features of switch stands, standard details of lamp tip, target shapes, day target discs for switch lamps, and switch stand connecting rods.

References.—Signalling, symbols, testing, standard aspects, wiring, circuits, etc. *See also* 718.40. Lenses and roundels. *See also* 525.3. Track transformers, line transformers. *See also* 713.5. Signal lighting transformers. *See* 713.5. Track bonding. *See* 718.49. Relays. *See* 718.43. Definitions, symbols, voltage and rating standards, methods of test, safety codes, for electrical apparatus. *See also* 710. Cast iron, forged steel, shafts. *See also* 611.11, 611.51, 611.52. Impregnation of windings. *See* 719.57, 719.59. Other electric motors. *See* 711.21, 711.22. Plain bearings, ball and roller bearings. *See also* 692.3, 766.2. Choke coils and lightning arresters. *See also* 715.50, 715.51. Electric lamps for signal apparatus. *See also* 716.11. Switchboard for signal systems (alternating current). *See also* 714.42. Resistors for signal apparatus. *See* 714.12. Oil lamps for signals. *See* 997.1. Other signals and signal controlling devices. *See* 718.42

718.42 Switch Operating Mechanisms and Signals

American Railway Assn. Signal Section. Mechanically Interlocking the Levers of Interlocking Machines; 1927. Required locking by and between derails, switches, facing point locks, signals, traffic levers, and special locking.

American Railway Assn. Signal Section. Inspecting and Testing Mechanical Locking of an Interlocking Machine; 1926. Required length of stroke of locking bars, permissible movement of locked levers or latches, list of prescribed locking tests.

American Railway Assn. Signal Section. Testing Electric Locking; 1926. Testing intervals, testing requirements for proper locking, operation of locks, and time intervals for electric approach locking, electric time locking, electric indication locking, electric switch lever locking, and electric traffic locking.

American Railway Assn. Signal Section 6528; 1928. Installation of Electric Interlocking. Contract specification form with blanks and provisions for filling in specific requirements, general requirements for equipment and installation with reference to A. R. A. specifications where available, including buildings, power supply and distribution, interlocking machine, switch operating mechanism, signals, wire and cable, etc.

American Railway Assn. Signal Section. 6628; 1928. Installation of Electro-Mechanical and Mechanical Interlocking. Contract specification form with blanks and provisions for filling in specific requirements, general requirements for equipment and installation with reference to A. R. A. specifications where available, including buildings, power supply and distribution, interlocking machine, leadout, pipe lines signals circuits, trunking, etc.

American Railway Assn. Signal Section 6725; 1925. Electro-Pneumatic Interlocking. Contract specification with blanks for filling in specific requirements, general requirements for equipment and installation, with reference to A. R. A. specifications where available, includes buildings, power supply and distribution, compressors, air pipe lines, levers, switch mechanism, signal, wiring, etc.

American Railway Assn. Signal Section 7530; 1930. Mechanical Interlocking Machine, S. & F. Locking. General design, materials of parts, and some dimensions of machine, height of legs, connection of parts, design of levers and locking.

American Railway Assn. Signal Section 7630; 1930. Electric Interlocking Machine. General design requirements for locking and for levers, inclosures, indicators, and contacts, surface leakage distance and dielectric strength test requirements for electrical apparatus.

American Railway Assn. Signal Section 9530; 1930. Universal Switch Circuit Controllers. Cam shaft type for 2 or 3 position operation and various combinations of front and back contacts, general design requirements for cast-iron case and cover, operating cam shaft, bearings, cams, crank, binding posts, contacts, surface leakage distance and dielectric test requirements.

American Railway Assn. Signal Section 9931; 1931. Electric Lock. Lock for lever of interlocking machine or for hand operated switch, general construction of lock and contacts, construction and insulation of coils, permissible variation in resistance, surface leakage distance and dielectric strength test requirements.

American Railway Assn. Signal Section 10131; 1931. Electric Motor Switch Operating Mechanism. Operating requirements, design requirements, surface leakage distance and dielectric strength test requirements for electrical apparatus.

American Railway Assn. Signal Section 11430; 1930. Mechanical Interlocking Machine, Style "A" Locking. General design, materials of parts, and some dimensions of machine, height of legs, connection of parts, design of levers and locking.

American Railway Assn. Signal Section 12127; 1927. Compensation of Pipe Lines for the Operation of Mechanical Units. Dimensions of crank type compensators, lengths of pipe line for which compensation is to be provided for a given temperature range and for various strokes, for switch operating and signal operating pipe lines.

American Railway Assn. Signal Section 12526; 1926. Electro-Mechanical Interlocking Machine, S. & F. Miniature Locking. General design requirements for machine, height of legs, connection of parts, general design and installation of levers and locking, leakage distance and dielectric strength test requirements for electrical apparatus, operating requirements for electrical indication and switch lever locking.

American Railway Assn. Signal Section 12729; 1929. Time lock. Lock for interlocking machine, range in time adjustments, general design requirements, surface leakage and dielectric strength test requirements for electrical apparatus.

American Railway Assn. Signal Section 13226; 1926. Electro-Mechanical Interlocking Machine, Unit Electric Levers, S. & F. Locking. General design and materials requirements for machine, connection of parts, general design requirements for levers and locking, surface leakage and dielectric strength test requirements for electrical apparatus.

American Railway Assn. Signal Section 13430; 1930. Electro-Mechanical Interlocking Machine, Vertical Locking. General design requirements for levers and their operating features and for locking, insulation and surface leakage distance, and dielectric strength and excess voltage test requirements.

American Railway Assn. Signal Section. 13831; 1931. Interlocking Lever Circuit Controller. For application to lever of interlocking machine, requirements on general design features, material and minimum opening of contacts, mounting, surface leakage distance and dielectric test for electrical apparatus.

American Railway Assn. Signal Section 14128; 1928. Installation of Automatic Interlocking.

Contract specifications with blanks for filling in drawings and individual specifications, dielectric test requirements for electrical apparatus, materials and apparatus specified by reference to A. R. A. specifications, covers power supply and distribution, foundations, signals, circuits, control apparatus, trunking and conduit, instrument and battery shelters.

American Railway Assn. Signal Section. 14731; 1931. Car Retarder System. For slowing down cars during distribution from hump, contract specification form for installation of system with materials according to various A. R. A. Signal Section specifications, requirements on sizes and installation of air pipe lines, inclosure and general structural features for control machine, car retarder operating mechanism, switch operating mechanism, and skate operating mechanism, time of operation requisites for latter two.

American Railway Assn. Signal Section. 14931; 1931. Centralized Traffic Control System. Installation specifications for signal and switch operating systems with equipment and materials specified by reference to A. R. A. standard specifications, blank spaces for filling in quantities, sizes, etc., dependent on particular installation.

American Railway Assn. Signal Section. 15031; 1931. Centralized Traffic Control Machine. Machine for the electric control of signals, switches, and other units. Requirements on design features, materials of contacts, insulation of windings, surface leakage distance, dielectric tests.

References.—Signaling, standard aspects, symbols, wiring, circuits, etc. *See also* 718.40. Railway signals. *See also* 718.41 and references thereunder. Methods of making electrical tests. *See also* 710. Wrought-iron pipe and steel pipe for signal and switch operation. *See also* 607.3, 607.4.

718.43 Relays

American Railway Assn. Signal Section. Instructions for Inspecting and Testing Alternating Current Relays and Indicators; 1931. Requirements on flexibility of contact fingers, compression of contact, contact openings, clearances of moving parts, armature end play, testing for pick-up, drop-away, and operating current or voltage, phase displacement, inspection.

American Railway Assn. Signal Section. Formula for Computing Limiting Resistances in Series with Track Battery; 1922. Formula and minimum allowable drop-away current for 2-ohm and 4-ohm track relays.

American Railway Assn. Signal Section. Inspecting and Testing Direct Current Relays; 1927. Permissible variation in resistance of coils, requirements on flexibility of contact fingers, operation, contact openings, contact resistances, armature end play and air gap, testing for pick-up, drop-away, and operating current or voltage.

American Railway Assn. Signal Section. Resistance of D. C. Relays; 1926. Eight recommended resistances of direct current neutral and polarized relays between 2 and 1,000 ohms.

American Railway Assn. Signal Section 7830; 1930. Alternating Current Relay. General design requirements for inclosures, binding posts, contacts, permanence of coating material with change in temperature, surface leakage distance for live parts, insulation of coils, test requirements for dielectric strength, excess voltage, clearances, pick-up and drop away values, and normal operation.

American Railway Assn. Signal Section 10529; 1929. Tractive Armature Direct Current Neutral Relay. Provided with first voltage range contacts, over-all dimensions, mounting of parts, construction of armature supports, air gap, coils, permissible variation in resistance and number of turns, contact design and resistance, torque, surface leakage distance, test requirements for dielectric strength. for drop-away and pick-up currents.

American Railway Assn. Signal Section. 14830; 1930. Alternating Current Power Transfer Relay. Requirements on number of front and back contacts, construction of enclosure, minimum relay air gap, type of binding posts, size of flexible connections and coil winding wire, adjustment, capacity, and resistance of silver contacts, dielectric test and permissible surface leakage distance.

References.—Track signals. *See* 718.40, 718.41, 718.42. Industrial controllers and testing. *See* 714.11. Definitions, symbols, voltage and rating standards, methods of test, safety codes. *See also* 710. Power transmission and distribution relays. *See* 714.14.

718.44 Emergency Signals

References.—Track torpedoes and fusees. *See* 863. Signaling flags. *See* 306.4.

718.49 Miscellaneous Railway Signals

American Railway Assn. Signal Section 2330; 1930. Channel Pin. For fastening bond wires into railroad rails, requirements on carbon content of steel or iron pin, dimensions, quality of tin in plating, driving, bend, and tin plating test requirements.

American Railway Assn. Signal Section 7419; 1920. Impedance Bond. General requirements for cast-iron case and cover, for surface leakage distance, for high voltage test of windings, permissible temperature rise, permissible variations in resistance, impedance, and power factor from specified values.

American Railway Assn. Signal Section 10420; 1921. Air-Cooled Reactor for Line and Track Circuits. Some general design requirements, quality of sealing compound, definition of capacity, required range in adjustment of impedance, temperature rise allowance according to rules of Am. Inst. of Elec. Engrs., surface leakage distance, test requirements for dielectric strength and excess voltage.

American Railway Assn. Signal Section. 12831; 1931. Time Release and Time Lock. Mechanical apparatus for introducing a time interval in the control of signal and switch circuits and levers of interlocking machines. Requirements on general structural features, material and minimum opening of contacts, dielectric test and surface leakage distance for electrical apparatus, blank spaces for entering sizes, etc.

American Railway Assn. Signal Section. 13530; 1930. Bonding for Track Circuits. For channel pin, plug, or welded type of bond, requirements on conductivity of bonded track for open track and tunnel track joints, drilling rail and applying bonds, weight of hammer for driving pins and plugs, installation features.

American Railway Assn. Signal Section. 15131; 1931. Plug Type Rail Bonds and Track Circuit Connectors. For bonds and connectors made of copper wire surrounded by steel wires, requirements on construction and dimensions, mechanical and electrical properties of steel and of copperwire, drive and bend test for plugs, welding, tin plating, stretching test of bond or connector.

References.—Petrolatum for impedance bonds. *See* 504.6. Methods of electrical testing. *See also* 710. Methods of testing and general requirements for metals. *See also* 600.1. Approach, warning, and engineman signs. *See also* 998. Bonding wire, copper. *See* 715.44. Bonding wire, steel. *See* 715.43.

718.5 TRAFFIC AND HIGHWAY SIGNALS

American Assn. of State Highways Officials. Nat. Bureau of Standards. National Safety Council, sponsors. Approved by American Standards Assn. as D 3–1927. Colors for Traffic Signals. For highway traffic signals, traffic significance of colors red, yellow, and green, traffic significance of vertical, inclined, and horizontal forms of luminous signs and signals, qualitative and quantitative definitions of colors for signals.

American Assn. of State Highway Officials. Nat. Bureau of Standards. National Safety Council, sponsors. Approved by American Standards Assn. as D 3–1927. Colors for Traffic Signals. For highway traffic signals at railroad crossings, requirements on prior warning time of operation of automatic approach warning signals; for flashing light type, requirements on height, spacing, range, and frequency of flashes, spread of beam, size of lenses; for wig wag type, requirements on length of stroke, size of disk, frequency of stroke; for nonautomatic signals, required significance of colors, qualitative and quantitative definitions of colors.

American Engineering Council. Street Traffic Signs, Signals and Markings; 1930. Submitted to American Standards Assn. for approval. (D–5.) Street Traffic Control Signals. Definitions of terms, classification of systems of control, 3 standard colors, color meanings and order of appearance, size of signal lense, capacity of lamp, visibility, position of colors, location and height of signal, timing intervals, types of train approach and of beacon signals, and other recommendations. Includes recommendations on colors, shape, and sizes of traffic signs, markings of street and curbs for traffic control, types and design of safety zones.

American Railway Engineering Assn. 1929 Manual. Grade Crossings. Highway Crossing Signs; 1929. Dimensions and finish of standard wood post crossing sign, approximate location of sign and signal for wig-wag or flashlight signal on signs so equipped, dimensions of advance warning sign.

National Conference on Street and Highway Safety. Manual on Street Traffic Signs, Signals and Markings; 1930. For train approach signals and for beacon signals, permissible types for each, required horizontal spacing of the 2 red lights in the flashing light train approach signal.

National Conference on Street and Highway Safety. Manual on Street Traffic Signs, Signals and Markings; 1930. For traffic control signals, permissible minimum size of signal lens, capacity of lamp, requirements on separate illumination of lenses, distance light is visible, relative position of colors, height of signals, time periods, location of signals on street.

718.6 RADIO APPARATUS AND EQUIPMENT

718.60 General Items

American Institute of Electrical Engineers. Report on Standards for Graphical Symbols Used in Radio Communication (17g3); 1929. A committee report recommending standard symbols for use in wiring diagrams, etc.

Associated Factory Mutual Fire Insurance Companies. Radio Installation Rules; 1925. Rules as taken from the 1925 edition of the National Electrical Code, sections 3702, 3703.

Institute of Radio Engineers. Report of Committee on Standardization; 1928. Abbreviations. Standard abbreviations for some radio terms, for metric prefixes, and letter symbols for vacuum tube notation.

Institute of Radio Engineers. Report of Committee on Standardization; 1931. Definitions of Terms Used in Radio Engineering. Definitions of terms referring to waves and wave propagation, transmission, reception, vacuum tubes, circuit elements and properties, antennas, direction finding, and electro-acoustic devices.

Institute of Radio Engineers. Report of Committee on Standardization; 1928. Standard Graphical Symbols Used in Radiocommunication. Illustrated list of defined standard symbols, list of suggested symbols for electro-acoustic devices.

Institute of Radio Engineers. Report of Committee on Standardization; 1928. Transmission Unit. Definition of the decibel and neper, the former being widely used in the United States.

Institute of Radio Engineers. Report of Standardization Committee; 1931. Safety Standards. For protecting operating personnel of radio transmitting stations, requirements on insulation and protection of antenna and antenna leads, protective requirements for transmitter and for power supply.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 302 and 303. Standard Terms and Definitions. Definitions of radio terms of general application, engineering definitions of terms used in connection with waves, frequency, coupling, amplification, etc. as adopted from Inst. of Radio Engineers.

U. S. Gov., Dept. of Commerce, Bureau of Standards LC280; 1930. Measurement of the Frequency of Distant Radio Transmitting Stations. Describes the use of the standard frequencies transmitted by the Bureau of Standards for measuring a piezo oscillator or station frequency using a radio-frequency generator, an audio-frequency generator and a receiving set.

U. S. Gov., Dept. of Commerce, Bureau of Standards H9; 1926. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for Radio Installations. Requirements on location, installation, and guarding of antenna and counterpoise, material and size of lead-in, type of construction at entrance to building, type and size of grounding conductor and ground, protective devices, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards S530; 1926. Establishment of Radio Standards of Frequency by the Use of a Harmonic Amplifier. Describes method of use of harmonic amplifier in producing, selecting, and amplifying harmonics of high frequency from a known low frequency source and using these frequencies for calibrating a wavemeter.

718.61 Antennas and Equipment

Institute of Radio Engineers. Report of Standardization Committee; 1931. Tentative suggested Methods of Testing and Rating Radio Transmitters and Antennas. For low frequency antennas, definitions of capacity and inductance, resistance, radiation resistance, power input and output, radiation efficiency, effective height, definitions of types of high frequency antennas, methods of resistance and impedance testing.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Radio Equipment. Not applicable to shipboard equipment. Minimum sizes and allowable materials for antenna, counterpoise, lead-in, and grounding conductors, clearance requirements, construction of lead-in bushings, location and operating characteristics of lightning arresters, grounding and grounding switch requirement.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 321. Receiver Antenna Devices. Standard nomenclature, list of materials and amounts of each in standard antenna unit package.

Radio Manufacturers Assn. (Inc.). M4–551; 1930. Antenna Unit Package. For a kit for radio receiver antenna, required material, such as size and lengths of antenna wire, ground wire, number and types of insulators, ground clamps, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards H9; 1926. Approved by American Standards Assn. as part of C2–1927 (National Electrical Safety Code). Safety Rules for Radio Installations. For receiving and transmitting antennas, of copper, bronze, or copper covered steel, requirements on minimum conductor sizes, insulators for high power stations, permissible supports, clearance from ground and from other conductors, special constructions, etc.

References.—Symbols, definitions, installation. *See also* 718.60. Wire. *See also* 715.44. Safety codes. *See* 718.60.

718.62 Electron Tubes

Institute of Radio Engineers. Report of Committee on Standardization; 1931. Methods of Testing Vacuum Tubes. Test procedure for determination of grid characteristic, plate characteristic, mutual, filament, and emission characteristics, tube constants, grid conductance, amplification factor, plate conductance, mutual conductance, ionization and leakage currents, capacitance, undistorted power output, detection characteristics, measurement of phototube characteristics.

Institute of Radio Engineers. American Institute of Electrical Engineers. Approved by American Standards Assn. as C 16c1–1929. Vacuum Tube Bases. Standard dimensions of the standard 4-pin vacuum tube bases, small type and large type, order of connection of elements of tube to the 4 pins in a triode.

Institute of Radio Engineers. Vacuum Tube Base Standards; 1930. Committee report on tentative draft of standards, giving dimensions and tolerances for small standard UX base, large standard UX base with bayonet pin and without bayonet pin, standard 5 prong UY base, cap for receiving tubes, 50-watt transmitting tube base, 3-pin large transmitting tube base, and plate cap of large transmitting tube, standard connections of terminals.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 340–111 Vacuum Tube. Engineering definitions of types, parts, characteristics, etc., dimensions, connections of pins, and numbering of pins for vacuum tube bases, for 4-pin small and large types, for 5-pin, and for small transmitting tubes, standard tube characteristics for various general purpose tubes and audio output tubes, including dimensions, rating, mutual conductance, impedance, and plate current.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 343–211 Rectifier Tube. Standard connections for elements of tube to pins of standard pin type tube base for hot cathode and for cold cathode rectifier tubes, standard dimensions and ratings of rectifier tubes for capacities up to 0.11 amperes.

U. S. Gov., Federal Specifications Board. 410; 1926. Radio Receiving Electron Tubes. For a low power tube with nominal base diameter of 1-inch and a nominal filament voltage of 1 volt, requirements on material of base, general tube construction, noise on vibration, interelement capacity, impedance, amplification constant not less than 5, emissivity, insulation resistance, gas test, grid characteristic test, mutual conductance test, dimensions of tube and contacts.

References.—Definitions, symbols. *See also* 718.60. Tube sockets. *See* 718.69.

718.63 Radio Transmitting Apparatus

American Institute of Electrical Engrs. Standard No. 45; 1930. Recommended Practice for Electrical Installations on Shipboard. Radio Equipments. For tube transmitters, recommended requirements on production of various frequencies in specified frequency range, continuity of frequency adjustments, frequency stability, plate current rise test, permissible time constant of key clicks, permissible power supply voltage variation, heat run test for key locked and for keying.

Institute of Radio Engineers, Report of Standardization Committee; 1931. Tentative Suggested Methods of Testing and Rating Radio Transmitters and Antennas. Definitions of power rating for continuous wave modulated and telegraph transmitters, methods of power measurement, definitions and methods of measurement for frequency tolerance, operational stability, percentage modulation, distortion.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 316–319. Transmitter Section. Engineering definitions of general terms and of terms referring to antennas as adopted from the Inst. of Radio Engineers, standard devices for control of constancy of transmitter frequency, standard ratings of broadcast transmitters, methods of rating station coverage, audio-frequency characteristics and modulation capability of broadcast stations. recommended standard practice in supervising modulation.

References.—Symbols, definitions, installation, transmission unit, frequency calibration, safety code. *See also* 718.60. Radio fixed condensers. *See* 713.1. Inductors, power transformers. *See also* 713.6, 713.5. Laminated insulating materials. *See also* 719.58. Antenna, tubes, wave meters. *See also* 718.61, 718.62, 718.65. Safety codes. *See* 718.60.

718.64 Radio Receiving Apparatus

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Radio Receiving Equipment. Recommended requirements on frequency range, number of tuned circuits and stages of amplification, emergency use of crystal detector, number of head receivers.

Institute of Radio Engineers. Tests of Broadcast Radio Receivers; 1931. Committee report, includes definitions of terms as sensitivity, selectivity, fidelity, normal test output, etc., requirements of testing apparatus, procedure for input and for output measurements, tests for sensitivity tuning range, selectivity, fidelity, overloading at high output, volume control, and hum.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 320. Receiver Section. Engineering definitions adopted from Inst. of Radio Engineers, requirements for standard humidity test for receivers.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 322–411. Resistors, Inductors, Capacitors for Receiving Sets. Recommended practice on filament resistor marking and method of mounting on panel, standard marking of resistors, requirements on accuracy of resistor rating, dimensions of grid resistor, standard dimensions of extension shafts and of holes in dials for panel mounted capacitors, recommended method of mounting adjustable capacitors, method of rating inductors.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 322–614. External Output Devices for Receiving Sets. Requirements on exposure of input and output terminals, voltage test requirements for connecting leads.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 324–011. Receiving Sets. Nomenclature, requirements on frequency range of broadcast receivers, standard markings of binding posts and terminals and terminal markings of power cable, standard color designations for external wiring, polarity of jacks, protection against high voltages, direction of motion of dials, knobs, and switches.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 325–011. Radio Receiver Cabinet. Requirements on standard sizes of B-battery compartments.

Radio Manufacturers Assn. (Inc.). M1–111 to M1–211; 1930. Definitions. Definitions of terms relating to radio receiving equipment, nomenclature of antenna parts.

Radio Manufacturers Assn. (Inc.). M2–131; 1930. Audio Coupling Devices. Standard methods of test for measuring the amplification per stage of interstage coupling devices in broadcast receivers.

Radio Manufacturers Assn. (Inc.). M3–111 to M3–221; 1930. Radio Receivers. Definitions of terms relating to receiving sets, their types and parts, standard on and off positions for lever and push pull switches, attachment of power cable, standard direction of rotation of controls and drum type dials, provision of fuses, insulation of leads for external output devices, terminal markings, etc.

Underwriters Laboratories. Power Operated Radio Receiving Appliances; 1930. For alternating current equipment, requirements on inclosure, use of standard parts in supply circuit, insulation of transformer, insulation of wires, accessibility and spacing of live parts, permissible operating temperature, dielectric test, maximum input test, nameplate marking.

Underwriters Laboratories. Power Operated Radio Receiving Appliances; 1930. For direct-current equipment, requirements on inclosure, use of standard parts in supply circuit, insulation of wiring, accessibility and spacing of live parts. interrupting capacity of tube sockets, operating temperatures, dielectric strength test, nameplate marking.

U. S. Gov., Dept. of Commerce, Bureau of Standards T256; 1924. Some Methods of Testing Radio Receiving Sets. Describes methods for testing sensitivity, selectivity, convenience of operation and simplicity of manipulation, effectiveness in covering the broadcast range, and ruggedness of construction.

References.—Symbols, definitions, installation, safety code. *See also* 718.60. Methods of electrical testing. *See also* 710. Fixed radio condensers. *See also* 713.1. Inductors. *See also* 713.6. Radio, audio, and power transformers. *See also* 713.5. Dry cell, A, B, and C batteries. *See* 712.1. Storage batteries. *See* 712.2. Connection cords for head sets and loud speakers. *See also* 715.42. Pilot lamps for dials. *See* 716.14. Laminated insulating materials. *See also* 719.58. Antenna, tubes, wave meters. *See also* 718.61, 718.62, 718.65. Socket power units, head sets, loud speakers, plugs, jacks, magnetic pick-ups, tube sockets, binding posts. *See also* 718.69.

718.65 Radio Instruments and Testing Apparatus

U. S. Gov., Dept. of Commerce. Bureau of Standards LC103; 1923. Description of a Series of Single Layer Inductance Coils Suitable for Radio-Frequency Standards. Gives construction features of 17 coils, number of turns, spacing, dimensions of framework, and the approximate inductance of the coils so constructed, covering range of 8 to 5,000 microhenries.

U. S. Gov., Dept. of Commerce. Bureau of Standards LC183; 1928. Directions for Use of the Piezo Oscillator and Auxiliary Generator for Calibration of a Radio Frequency Meter. Directions with diagrams for operation of auxiliary generator, for transfer of a frequency from auxiliary generator to frequency meter, for operation of piezo oscillator, and for calibration of wave meter.

U. S. Gov., Dept. of Commerce. Bureau of Standards LC185; 1926. Portable Frequency Meter for Frequencies from 1,500 to 15,000 kilocycles, Bureau of Standards Type K. Specifications of instrument designed for use by radio inspectors, requirements on precision, dimensions, materials, and construction of condenser, dial, inductance coils, panel, and cabinet.

U. S. Gov., Dept. of Commerce, Bureau of Standards LC186; 1928. Portable Piezo Oscillator, Bureau of Standards Type N. Specifications of type designed for use by radio inspectors for calibration of frequency meters and maintaining constant frequency of transmitting stations, requirements on general design, connection, winding of coils, dimensions of quartz plate and plate holder, dimensions and material of panel and cabinet, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards LC187; 1926. Portable Auxiliary Generator, Bureau of Standards Type O. Specifications for radio-frequency generator designed for use by radio inspectors, for use with piezo oscillator for calibration of frequency meters, requirements on general design, on connections, panel material and construction, capacity of condenser, winding of coils, construction of cabinet, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards S489; 1924. Primary Radio-Frequency Standardization by Use of the Cathode Ray Oscillograph. Describes method of high accuracy for calibrating a wave meter from a tuning fork using Lissajous patterns produced by the oscillograph for adjusting radio-frequency generating sets to multiples of the frequency of the standard tuning fork.

References.—Meters for measurement of electrical quantities. *See also* 714.3. Frequency calibration. *See also* 718.60.

718.66 Applications of Radio

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Radio-compass. Recommendations on the amount and types of equipment required, rotational feature of antenna, balancing out property of receiver to give one direction indication, location and installation rules, calibration tests, list of spare parts, tests for sharpness of minima, sensitivity, selectivity, determination of sense, battery voltage drop, interference from local induction.

Radio Manufacturers Assn (Inc.). M9–111 to M9–121, incl.; 1930. Television. Definitions of terms relating to television, recommended practice on standard direction of scanning and 3 standard combinations of lines per frame and frames per second.

References.—Radio receiving equipment. *See also* 718.64. Photo tubes. *See* 718.62.

718.69 Miscellaneous Radio Apparatus and Equipment

Institute of Radio Engineers. Report of Standardization Committee; 1931. Performance Indexes and Tests of Electro-Acoustic Devices. For radio loud speakers and microphones, defines relative loudness efficiency and response, gives standard methods of measuring and preferred method of presenting data.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 322–114 Receiver Vacuum Tube Sockets. Standard dimensions and spacing of holes in socket for receiving 4-pin and 5-pin tubes, standard terminal markings.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 322–211 Receiver Plugs and Jacks. Dimensions of one standard size of each, dimensions tolerances, contact pressures in spring jacks and voltage breakdown test requirements for plugs and jacks.

National Electrical Manufacturers Assn. Handbook of Radio Standards, 1928. 322–311. Receiver Terminals and Binding Posts. Dimensions of standard cylindrical type cord tip and of standard pin type cord tip, test requirements for strength of soldered connection of cord tips or of terminals, dimensions of standard spade type cable terminal for battery connecting conductors, drilling dimensions for binding posts to receive cord tips.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 323–114. Loud Speakers. Requirements on voltage breakdown test, humidity test, and impedance of loud speakers.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 323–311. Radio Head Sets. Requirements on impedance limits and method of measurement, marking of polarity.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 323–511. Magnetic Pickups. For magnetic pickups for phonograph records, standard method of connecting pickup to plug for plug and jack connection to receiving set.

National Electrical Manufacturers Assn. Handbook of Radio Standards; 1928. 333–011 Socket Power Units for Receiving Sets. Nomenclature, requirements on type of output terminals, standard marking of all terminals, provision of disconnect switch, standard voltage ratings, safety rules based on Underwriters Laboratories specifications, including requirements on parts to be inclosed and type of inclosure, kinds of insulating materials, insulation of transformers, inaccessibility or automatic opening of high-voltage circuits when cover is opened, maximum power output on high voltage terminals.

Radio Manufacturers Assn. (Inc.). M2–111, and M4–117 to M4–121, incl.; 1930. Plugs and Jacks. Standard dimensions and tolerances for 6 standard sizes of radio plugs and 7 standard sizes of radio jacks, polarities and polarity markings for jacks, required contact pressures for jacks of spring type, voltage test for breakdown and where applied.

Radio Manufacturers Assn. (Inc.). M4–113; 1930. Binding Posts. For binding posts for radio receiving sets, standard dimensions of cord tip openings and fastening screw locations to accommodate the standard pin type and cylindrical type of cord tip.

Radio Manufacturers Assn. (Inc.). M4–127 to M4–129, incl., 1930. Vacuum Tube Socket. Standard dimensions and spacing of pin receptacles in sockets, standard spacing of mounting holes, for 4-pin tube bases and 5-pin tube bases.

Radio Manufacturers Assn. (Inc.). M4–501 to M4–504, incl.; 1930. Socket Power Unit Requirements on type of output terminal, standard terminal markings, provision of switch and by-pass condenser.

Radio Manufacturers Assn. (Inc.). M5–111 and M5–112; 1930. Electro-Dynamic Speakers. Standard method of measuring the cone size of speaker, recommended practice on expressing the direct current resistance of voice coil in specifying electrical characteristics.

Radio Manufacturers Assn. (Inc.). M5–151 and M5–152; 1930. Radio Head Set. Permissible range of impedance of standard head sets, standard markings for polarity.

References.—Telephone plugs and jacks. *See* 718.29.

718.7 SOUND RECORDING AND REPRODUCING APPARATUS

Underwriters Laboratories. Sound Recording and Reproducing Equipment; 1930. Requirements on inclosing equipment and thickness of metal in enclosures, insulation of transformer windings, exposure of live parts, grounding, attachment of sound head to projector, permissible temperatures, dielectric strength test requirements.

References.—Magnetic pick-up. *See also* 718.69. Motion picture projectors. *See* 912.

719. MISCELLANEOUS ELECTRICAL APPARATUS

719.1 AUXILIARY ELECTRICAL EQUIPMENT

References.—Auxiliary motors for ships. *See* 711.21, 711.22.

719.3 MAGNETOS

Society of Automotive Engineers 1931 Handbook. Magneto Mountings; 1923. For motorboats, standard dimensions of magneto coupling and shaft end, dimensions of mountings.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Magneto Mountings; 1923. Standard dimensions of Magneto coupling and shaft end, dimensions of mountings, for motorcycles.

Society of Automotive Engineers 1931 Handbook. Magneto Mountings, Aeronautic; 1929. Dimensions for mounting flanges and bolt holes for standard mountings for 2 bolt and 3 bolt flanged type mountings.

Society of Automotive Engineers 1931 Handbook. Magneto Mountings; 1923. Dimensions of standard magneto coupling and shaft end, standard dimensions of mounting, for motor trucks and for passenger cars.

719.4 SPARK PLUGS

Society of Automotive Engineers; 1931 Handbook. Aeronautic Spark Plug Terminal; 1929. Dimensions of standard terminal.

Society of Automotive Engineers 1931 Handbook. Aeronautic Spark Plugs; 1929. Standard dimensions of spark plug, spark plug thread tolerances, tapped hole thread tolerances, same as those of regular S. A. E. metric spark plug specifications, dimensions of spark plug terminal.

Society of Automotive Engineers 1931 Handbook. Metric Spark Plugs; 1930. Dimensions of Standard 18 mm spark plug, tolerances on threads for spark plug and for tapped hole.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Spark Plug Terminals; 1926. Standard terminal thread of spark plugs, dimensions of post type, ball type, and slip type terminals.

Society of Automotive Engineers 1931 Handbook. Spark Plugs; 1928. Dimensions of threaded portion for ⅞-inch spark plugs for two sizes of hexagonal heads, tolerances for plug thread and for tapped hole thread.

719.5 ELECTRICAL INSULATING MATERIALS

719.50 General Items

American Institute of Electrical Engineers. Standard No. 4; 1928. Measurement of Test Voltage in Dielectric Tests. Standard methods of measurement with voltmeter, needle spark gap and sphere spark gap, tables of spark-over voltages, requirements for testing equipment.

American Institute of Electrical Engineers. Standard No. 41; 1925. Insulator Test Specifications. Defines the methods of making the various tests when such are required. Definitions, design tests and routine tests for both pin and suspension insulators. Available in Spanish from Bureau or Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Society for Testing Materials. Tentative Test Methods D 149–31T; 1931. Methods of Testing Sheet and Tape Insulating Materials for Dielectric Strength. For rubber insulating tape use A. S. T. M. method D 119 and for friction tape use A. S. T. M. method D 69. Dimensions and design of testing electrodes for both tapes and sheet, test procedure for short time, one minute step by step method, and endurance at 100° C. test for dielectric strength. Method of making dielectric tests of laminated sheet material.

American Society for Testing Materials. Tentative Test Methods D 150–31T; 1931. Methods of Testing Electrical Insulating Materials for Power Factor and Dielectric Constant at Frequencies of 100 to 1,500 Kilocycles. For solid insulating materials. Definitions, preparation of test specimens and test procedure for testing molded and sheet material, varnish films, and laminated tubes, substitution method and bridge method.

American Society for Testing Materials. Tentative Test Methods D 176–29T; 1929. Methods of Testing Cable Splicing and Pothead Compounds. Apparatus and test procedure for brittleness, dielectric strength, and coefficient of expansion. other tests in accordance with following A. S. T. M. methods; melting point, D 127; softening point, D 36; flash and fire points, D 92; evaporation, D 6; viscosity, D 88; penetration, D 5.

American Society for Testing Materials. Tentative Test Methods D 256–28T; 1928. Methods of Testing Insulating Materials for Resistance to Impact. For determination of relative toughness, dimensions and design of test specimen, test procedure for Charpy or simple beam method, and for Izod or cantilever beam method.

American Society for Testing Materials. Tentative Test Methods D 257–29T; 1929. Methods of Test for Resistivity of Insulating Materials. Design and application of test electrodes to tubular, flat, and liquid insulating materials, apparatus and circuits, control of humidity, procedure for measurement of volume resistance and for surface resistance, calculations.

American Society for Testing Materials. Tentative Method of Test D325–31T; 1931. Method of Test for Comparing the Thermal Conductivity of Solid Electrical Insulating Materials. For flat sheets, specifications for test apparatus and test specimen, test procedure using method analogous to potentiometer method for comparing electrical resistances.

U. S. Gov., Dept. of Commerce, Bureau of Standards S471; 1923. Methods of Measurement of Properties of Electrical Insulating Materials. Describes methods and apparatus found practicable at the bureau for measuring phase difference and dielectric constant, voltage effects at radio frequencies, electrical resistivities, density, moisture absorption, tensile and transverse strength, hardness, impact strength, permanent distortion, machining qualities, thermal expansivity, effects of chemicals.

719.51 Asbestos and Mica

American Society for Testing Materials. Tentative Specifications. D 315–31T; 1931. Asbestos Tape for Electrical Purposes. Cotton content and tensile strength requirements for yarn, construction and yardage requirements for tape, tolerances on width and thickness. Test methods for cotton content according to A. S. T. M. method D 299.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Nonmetallic Conduit; 1929. Dimensions of nonmetallic, nonconducting, flexible conduit for protection of insulated wires, waterproofing requirements, tension, bending, flattening, water absorption, flame, and softening under heat, test requirements.

References.—Methods of testing asbestos yarns. *See* 545.4. Textile testing machines. *See* 770. Methods of testing for insulating qualities. *See also* 719.50.

719.52 Insulating Fiber and Paper

American Railway Assn. Signal Section 1323; 1923. Hard Fiber. For railway track joints, switch rod, and track circuit insulation, allowable variations in size, test requirements for electrical surface leakage, specific gravity, compression, and water absorption.

American Society for Testing Materials. Tentative Test Methods D 202–30T; 1930. Methods of Testing Untreated Insulating Paper. Sampling and conditioning of sample, apparatus requirements and test procedure for moisture content, thickness, tensile strength, tearing and bursting strengths, absorption, apparent density, resistance to air passage, ash, acidity or alkalinity, conducting paths, dielectric strength by A. S. T. M. method D 149.

National Electrical Manufacturers Assn. Publ. No. 31–7; 1931. Vulcanized Fiber. For vulcanized fiber sheets, strips, tubing, and rods, standard colors, standard tolerances on thickness and diameter.

National Electrical Manufacturers Assn. Publ. No. 31–7; 1931. Vulcanized Fiber. For commercial grade and hard bone laminated fiber sheets and tubing, allowable variations in thickness from nominal sizes for sheets and strips, requirements on tensile strength, transverse strength, dielectric strength, water absorption, hardness, and specific gravity, methods of testing.

References.—Methods of electrical testing of insulating materials. *See also* 719.50. Methods of physical testing of paper and fiber. *See also* 470.3. Other fiber board (nonelectrical). *See* 472.93. Paper in paper insulated cable. *See also* 715.41.

719.53 Marble and Slate Insulation

References.—Electrical slate. *See* 511.53. Methods of testing insulating qualities. *See* 719.50. Cut out bases. *See* 714.22. Panels and panelboards. *See* 714.41. Switchboards. *See* 714.42 and 718.22.

719.54 Porcelain Insulation

References.—Electrical porcelain, porcelain insulators. *See* 532.22. Methods of testing insulating qualities. *See* 719.50, 532.22.

719.55 Rubber Compounds and Tapes

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Rubber Insulation for Conductors and Cables. Requirements on content of Hevea rubber, permissible waxy hydrocarbons and free sulphur.

American Institute of Electrical Engineers. Standard No. 63; 1928. Joint sponsor with American Electric Railway Assn., American Railway Engineering Assn., American Society for Testing Materials Assn. of Edison Illuminating Companies, Assn. of Railway Electrical Engineers, National Board of Fire Underwriters, National Electric Light Assn., National Electrical Mfrs. Assn., National Fire Protection Assn. under auspices of American Standards Assn. as C 8d1–1928. Specifications for 30 Per Cent Rubber Insulation for Wire and Cable for General Purposes. For use on voltages up to 5,000 volts, requirements on thickness of insulation, its chemical properties, tensile strength and specific gravity, high voltage and insulation resistance test requirements of wire and cable, mechanical tests of insulation.

American Railway Assn. Electrical Section. VIII–b–27; 1927. Rubber Insulating Tape. Requirements on chemical composition of rubber compound, tensile strength and dielectric strength, fusion test, standard weights, dimensions, and variations.

American Railway Assn. Signal Section 5616; 1916. Rubber Insulating Tape. Unvulcanized, percentage, sizes, and quality of dry rubber, whiting, zinc oxide, and other ingredients, test requirements for tensile strength, specific gravity, fusion by heat, chemical composition, and dielectric strength, dimensions.

American Railway Assn. Telegraph and Telephone Section. 2–G–34; 1928. Rubber Insulating Tape ARA–2–A. Quality requirements of rubber, modified A. S. T. M. method of chemical analysis, test requirements for tensile strength, dielectric strength, and fusion at room temperature, standard weight, dimensions, and variations.

American Society for Testing Materials. D 48–30; 1930. Methods of Testing Molded Insulating Materials. Applicable to all solid insulating materials formed in molds by application of pressure, with or without heat, dimensions of molded test specimens and of holder, test procedure for determination of tensile, compressive and transverse strength, for dielectric strength, distortion under heat, absorption.

American Society for Testing Materials. Tentative Specifications D 119–28T; 1928. Rubber Insulation Tape. For insulating joints in electric wires and cables, construction, chemical composition, tensile strength, dielectric strength, and fusion test requirements, standard weight, dimensions and permissible variations.

American Society for Testing Materials. Tentative Methods D 297–31T; 1931. Methods of Chemical Analysis of Rubber Products. Includes a short procedure for determination of acetone extract, free sulphur, alcoholic-potash extract, total sulphur, and ash. Also a complete procedure for 30 per cent Hevea rubber compounds, including above determinations and total sulphur, antimony, free carbon, etc.

U. S. Gov., Federal Specifications Board 292; 1925. Rubber Insulating Tape. Requirements on general quality, percentage of Hevea rubber, allowable sulphur and waxy hydrocarbons, thickness and weight for ½, ¾, and 1-inch widths, tensile strength, vulcanizing quality, dielectric strength, methods of test as specified in F. S. B. 59 for rubber goods.

U. S. Gov., Federal Specifications Board 587; 1928. 30 Per Cent Rubber Insulation for Wire and Cable for General Purposes. Requirements of this specification are identical with those of Am. Inst. of Elec. Engrs. and other organizations as approved by American Standards Assn.

References.—Methods of testing. *See also* 719.50. Methods of testing rubber goods. *See also* 200. Rubber insulated cables, cord, wire. *See* 715.41, 715.42, 715.44. Rubber matting for use around electrical apparatus. *See* 208.1.

719.56 Textiles Used for Electrical Insulation

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Varnished Cambric. Cloth for insulation of electrical conductors and cables, requirements on general quality, thickness, number of varnish coatings, dielectric strength, bending test in cable.

American Institute of Electrical Engineers. Standard No. 45; 1930. Recommended Practise for Electrical Installations on Shipboard. Varnished Cambric Insulation. For the insulation as used on cables, recommended requirements on thread count, thickness, freedom from wrinkles and blisters, number of varnish coatings, bending test, tensile strength of varnished cloth, resistance of varnish to heat.

American Railway Assn. Electrical Section. VIII–a–26; 1926. Friction Tape. Requirements on general quality and thread count of cotton sheeting used, permissible sulphur in rubber base frictioning compound, impregnation of fabric, adhesive test, tensile strength, pinhole test, and dielectric strength test requirements, standard thicknesses and roll sizes, permissible variations.

American Railway Assn. Signal Section 8226; 1926. Friction Tape for Railroad Use. Requirements as to quality, number of threads, and weight of cotton sheeting, composition of rubber base frictioning and method of application, test requirements for adhesion, tensile strength, pinholes, and dielectric strength, standard weights and dimensions.

American Railway Assn. Telegraph and Telephone Section. 2–G–30; 1927. Friction Tape. Weave and weight of cotton sheeting base, maximum sulphur content of rubber base insulating compound, permissible number of pinholes in finished tape, adhesive, tensile strength, and dielectric test requirements, standard weight, dimensions and variations.

American Society for Testing Materials. D 69–28; 1928. Friction Tape for General Use for Electrical Purposes. General construction, test requirements for presence of sulphur, for pinholes, tensile strength, adhesion between layers, and dielectric strength, standard dimensions, weight and permissible variations.

American Society for Testing Materials. D 259–27; 1927. Tolerances and Test Methods for Electrical Silk and Cotton Tapes. Tolerances on width, thickness, weight, and weave, test procedure for measurement of above items, and for tensile strength.

American Society for Testing Materials. Tentative Specifications D 259–31T; 1931. Tolerances and Test Methods for Silk and Cotton Tapes. A complete revision of D 259–27 of A. S. T. M., permissible tolerances on thickness, width, weight, and construction, methods of testing for thickness, width, weight, construction, and tensile strength.

American Society for Testing Materials. Tentative Test Methods D 295–29T; 1929. Methods of Testing Varnished Cloths and Varnished Cloth Tapes. Applicable to straight cut and bias cut materials. Selection and conditioning of sample, measurement methods for thickness, tensile strength, elongation and deformation of bias material and effect on dielectric strength, resistance to oil and petrolatum, weight, and threads per inch.

American Society for Testing Materials. Tentative Specifications D 335–31T; 1931. 0.007 inch. Cotton Tape. For cotton tape used in electrical industry, permissible sizing, requirements on nonacidity, on number of ends, picks, weight, and tensile strength for tapes ½ inch to 1½ inches width, using test methods of D 259 of A. S. T. M.

Insulated Power Cable Engineers Assn. Varnished Cambric Insulated Cable; 1929. Includes varnished cambric insulation, requirements on thickness, thread count, thickness of coating, tensile strength, dielectric test, heat test.

U. S. Gov., Federal Specifications Board HH-T-101; 1930. Friction Tape. For 2 grades, one for general use and one for tropical conditions, requirements on general quality of cotton sheeting, freedom of impregnating compound from sulphur, friction test, adhesion of compound, thickness of tape, permissible number of pinholes, weight, dielectric strength for 5 widths, methods of test according to F. S. B. spec. 59.

References.—Insulating varnish. *See also* 719.57. Methods of testing. *See also* 719.50. Methods of testing rubber filled tape. *See also* 200. Methods of physical and chemical testing of fabrics. *See also* 300.4. Test methods and tolerances for electrical cotton yarns. *See* 302.10. Varnished cambric insulation on wires and cables. *See also* 715.44, 715.41.

719.57 Electrical Insulating Varnishes

American Railway Assn. Signal Section. Varnish Treatment of Electrical Windings; 1922. To protect winding against moisture or corrosion by carbonic acid, animal salts, salt air, etc., not to become dry, dusty, nor soften or crumble, to be elastic and not to harden, crystallize or flake between the temperatures given.

American Society for Testing Materials. Tentative Test Methods D 115-31T; 1931. Methods of Testing Insulating Varnishes. Preparation of specimen and test procedure for measuring specific gravity, time of drying, dielectric strength, water absorption, heat endurance, oil proof, draining, evaporation, nonvolatile matter, volume of volatile matter, dielectric strength in liquid state.

References.—Varnish. *See* 846. Other impregnating treatments of windings. *See* 719.59.

719.58 Molded and Laminated Insulating Materials Bakelite and Similar Products

American Society for Testing Materials D 48-30; 1930. Methods of Testing Molded Insulating Materials. Applicable to all solid insulating materials formed in molds by application of pressure, either with or without heat, dimensions of molded test specimens and of tension specimen holder, test procedure for determination of tensile, compressive and transverse strength, for dielectric strength, distortion under heat, and water absorption.

American Society for Testing Materials. Tentative Test Methods D 149-31T; 1931. Methods of Testing Sheet and Tape Insulating Materials for Dielectric Strength. Includes test procedure for dielectric tests of laminated sheet materials at room temperatures and at other temperatures.

American Society for Testing Materials. Tentative Test Methods D 229-31T; 1931. Methods of Testing Laminated Sheet Insulating Material. Dimensions and selection of test specimens, test procedure for tensile, flexural, and compressive strengths, for total absorption and rate of absorption of water, for volatile matter, dielectric strength test according to A. S. T. M. D 149, power factor, D 150.

National Electrical Manufacturers Assn. Handbook of Supply Standards, 1927. No. 236-210. Laminated Phenolic Products. Tolerances on thickness and dimensions of plates and on diameters of tubes for laminated phenolic plate with duck, asbestos, or paper base, and for laminated phenolic tubing.

References.—Methods of electrical testing. *See also* 719.50. Methods of physical testing of paper and of fiber board. *See also* 470.3.

719.59 Miscellaneous Electrical Insulating Materials

American Railway Assn. Signal Section. Impregnating Compound Treatment of Oil Proof Electrical Windings; 1922. To protect windings against moisture or corrosion by carbonic acid, animal salts, salt air, etc., not to become dry or dusty, soften or crumble, coils to be so treated that surface is uninjured by oil, compound to be plastic and not to drip, flow or flake in range of temperature given.

American Railway Assn. Signal Section. Impregnating Compound Treatment of Partially Oil Proof Electrical Windings; 1922. To protect winding against moisture, or corrosion by carbonic acid, animal salts, salt air, etc., not to become dry or dusty, soften or crumble, not to dissolve or disintegrate from drops of oil or grease, to be plastic, not to drip, flow or flake in the range of temperature given.

American Railway Assn. Signal Section. Impregnating Compound Treatment of nonoil-Proof Electrical Windings; 1922. To protect winding against moisture, or corrosion by carbonic acid, animal salts, salt air, not to become dry and dusty or soften, to be plastic, not drip, flow or flake within specified temperatures.

U. S. Gov., Federal Specifications Board JJJ-W-151; 1930. Sealing Wax. Includes one grade for sealing bottles, use as insulation, etc., requirements on general quality, flame carrying capacity, resistance to conversion, and consistency at temperature of use, test methods.

References.—Varnish treatment of windings. *See* 719.57. Transformer oil. *See* 504.8. Wooden insulators and insulator pins. *See* 429.7. Glass insulators. *See* 526.1. Cap and cone insulators for trolley wire support. *See* 719.63. Globe, composition, and Brooklyn strain insulators. *See* 719.63. Petrolatum for use in impedance bonds. *See* 504.6. Petroleum asphaltum for protecting wires in trunking. *See* 505.14.

719.6 ELECTRICAL LINE MATERIALS, AERIAL AND UNDERGROUND

719.60 General Items

American Electric Railway Engr. Assn. Misc. Methods and Practices. D203-14; 1914. Specification for Joint Use of Wood Poles. Classification of attachments, position and vertical spacing of attachments, attachment of line wires, cables, lateral and vertical wires, transformers, cable boxes, electric lamp fixtures, railway span wires and brackets, guys, provision of climbing space, and illustrative drawings.

American Railway Assn. Electrical Section. VI-a-23; 1923. Electric Light, Power Supply and Trolley Lines Crossing Railways. Construction requirements including requirements on minimum clearance between lines of various voltages and top of rail, vertical clearance between lines, clearance of conductors from supports, guy wires, and other conductors, separation of conductors at supports, loadings to be used in design, minimum sizes of conductors, factors of safety in design of conductors, insulators, insulator pins, and supporting structures, flashover voltages of insulators, sizes of cross-arms, minimum size and setting of wood poles, structural requirements for steel structures and foundations, permissible unit stresses in wood poles, wood cross-arms, steel supporting structures, rivets and bolts, concrete, and conductors. Construction requirements for underbridge crossings and for underground crossings.

American Railway Assn. Electrical Section. VI-b-25; 1925. Construction of Overhead Electric Supply Lines for Railroad Use on Railroad Property. Requirements on relative levels of high voltage circuits, line clearance from tracks, ground, other lines, trees, buildings, etc., separation of conductors at supports, mechanical loadings to be used in design, minimum sizes of conductors, flashover voltage requirements for insulators, minimum size and strength of crossarms, minimum size and depth of setting of wood poles, construction and minimum sizes of elements for steel towers, strength of foundations, guying, grounding, permissible unit stresses for wood and for steel supporting structures for 2 types of construction dependent on location of line.

American Railway Assn. Electrical Section. VI–c–26; 1926. Joint Use of Poles for Power, Communication, and Signal Circuits. Classification of circuits into 4 classes, relative location and spacing requirements for the various classes, requirements on climbing space, methods of supporting and minimum sizes of conductors, etc.

American Railway Assn. Telegraph and Telephone Section. 1–A–24; 1927. Joint Use of Poles for Power, Communication, and Signal Circuits. Classification of circuits, requirements on relative position and spacing of circuits, climbing space, methods of supporting conductors and cables, minimum sizes of conductors, insulation and support of vertical conductors, installation of cable boxes, pole steps, guy insulators, dimensions of cross arms.

American Railway Assn. Telegraph and Telephone Section. 1–B–1; 1929. Wire Crossings. Specifications for telegraph, telephone, and other communication wires and cables crossing the tracks of steam and electrified railroads, for overhead, underbridge, and underground crossings, construction requirements for various types of construction.

American Railway Assn. Telegraph and Telephone Section. S–1; 1923. Electric Light, Power Supply, and Trolley Lines Crossing Railways. Clearances, sizes of conductors, insulators, permissible stresses and types of construction.

U. S. Gov., Dept. of Commerce, Bureau of Standards H8; 1926. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the Operation of Electrical Equipment and Lines. Precautions and rules to be observed in handling supply lines and equipment, killing lines or equipment, making protective grounds, for overhead and underground power lines and communication systems, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards H10; 1927. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the Installation and Maintenance of Electrical Supply and Communication Lines. For overhead lines, requirements on relative levels on pole of various classes of lines, on clearance between supporting structures and other objects, between wires and ground or rails, between crossing lines, between conductors of same line, climbing and working spaces, grades of construction, assumed loadings, strength requirements for various parts of line construction, requirements of insulators, tables of recommended normal sags of copper conductors, minimum permissible sags with tensions and stresses, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards H10; 1927. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the Installation and Maintenance of Electrical Supply and Communication Lines. For underground lines, requirements on location and construction of duct systems and manholes, location, separation, and protection of conductors, guarding of live parts in manholes, etc.

719.61 Electric Wire and Cable Supports

American Railway Assn. Telegraph and Telephone Section. 1–A–20; 1927. Pole Line Hardware. Includes break iron pin, and cross arm steel pins, tensile and bend test requirements of steel, dimensions and bend test requirements for the insulator pins, galvanizing requirements according to A. R. A. specifications.

American Railway Assn. Telegraph and Telephone Section. 2–G–3; 1924. Cross Connecting Ring ARA–1–A. and 2–G–4; 1924. Cross Connecting Ring ARA–2–A. Made of soft steel band and rod, dimensions and construction, pull test requirements for riveted joint, galvanizing requirements. Used for grouping and supporting the connecting wires between protectors and terminal blocks in metal boxes.

National Electric Light Assn. Suggested Specifications D340–28T; 1928. Tentative. 1-inch Steel Pin (Low Voltage). For insulator pins of shell type (patented), lead type, spring type (patented), lag screw type, and machine bolt type, dimensions and allowable variations, for one size, threads per inch, detail of thread according to N. E. L. A. specifications D992–993–994, material according to D200–22 and D209–22, galvanizing according to D210–22.

National Electric Light Assn. Suggested Specifications. D350–28T; 1928. Tentative. Steel Pin (Medium Voltage). For drop forged insulator pin, bolt type, dimensions and allowable variations for 1-inch and 1⅜-inch thread diameters, material according to N. E. L. A. specifications D200–22, D209–22, galvanizing according to D210–22.

National Electric Light Assn. Suggested Specifications D355–28T; 1928. Tentative. Pole Top Pipe Pin. Insulator pin made of steel pipe, design, dimensions and allowable variations, using lead thimble with thread according to N. E. L. A. specification D992–28T.

National Electric Light Assn. Suggested Specifications D920–28T; 1928. Tentative. Secondary Rack. Steel rack for large type spool insulators (D581–23) for attachment to pole, dimensions, and permissible variations, general construction of 3 types, material according to N. E. L. A. specifications D200–22, galvanizing according to D210–22.

National Electric Light Assn. Suggested Specifications D992–28T; 1928. Tentative. 1-inch and 1⅜-inch Cast Lead Pin Thread — D993–28T; 1928. Tentative. 1-inch and 1⅜-inch Wire Pin Thread — D994–28T; 1928. Tentative. 1-inch and 1⅜-inch Pressed Steel Pin Thread. For 4 threads per inch, detail dimensions of thread and allowable variations.

References.—Construction of lines, crossings, safety codes. *See* 719.60. Zinc coatings. *See also* 600.3. Methods of testing and general requirements for metals. *See also* 600.1. Wood insulator pins. *See* 429.7. Glass insulators, porcelain insulators. *See* 526.1, 532.22. Insulator gages. *See* 615.82.

719.62 Poles and Appurtenances

American Electric Railway Engr. Assn. Recommended Specification D102–29; 1929. Overhead Line Materials for Direct and Catenary Suspension. Includes steel cross arm braces, guy clamps, guy hooks, pole bands, pole steps, lag screws, hangers, round and square washers, guy plates, hub guards, thimbles, and insulator pins of steel and malleable iron; porcelain insulators; wood crossarms, insulator pins, strain insulators, and switch boxes; steel cable. Requirements on dimensions and permissible variations, steel according to A. S. T. M. Spec. A–9 for structural steel for buildings, and malleable iron according to A. S. T. M. Spec. A–41 for refined wrought iron bars.

American Railway Assn. Telegraph and Telephone Section. 1–A–20; 1927. Pole Line Hardware. For two grades of steel, with tensile and bend test requirements for the better grade, galvanizing requirements according to A. R. A. specifications 1–D–5. Covers material, dimensions, finish, and 1–D–5. Covers material, dimensions, finish, and assembly for rock guy anchors, ⅜-inch carriage bolt, crossarm bolt, double arming bolt, ½-inch machine bolt, flat cross-arm braces, angle cross-arm braces, H fixture braces, break iron, 2 and 3 bolt guy clamps and messenger clamps, guy hook, messenger reinforcing link, break iron pin, cross-arm steel pin, guy rods, fetter drive screws, pole step, reinforcing strap, safety strap, pothead support, hub guard, guy plate, thimbles, washers, wooden cobs for steel insulator pins.

American Railway Assn. Telegraph and Telephone Section. 1–A–26; 1928. Cast-Iron Strand Connector. Dimensions and permissible variations for galvanized egg shaped connectors, galvanizing according to A. R. A. specification 1–D–5.

American Railway Assn. Telegraph and Telephone Section. 1–A–27; 1928. Dead-Ending Shackle. Tensile strength and bend test requirements for pin, bend test requirements for shackle of sheet steel, galvanizing according to A. R. A. specification 1–D–5, dimensions and permissible variations.

National Electric Light Assn. Suggested Specifications D220–28T; 1928. Tentative. Flat Cross Arm Brace D225–28T; 1928. Tentative. Alley Arm Brace D230–28T; 1928. Tentative. Angle Cross Arm Brace. Dimensions and allowable variations for steel braces of various sizes, material according to N. E. L. A. specifications D200–22, galvanized according to D210–22. Publ. No. 289–45 of N. E. L. A.

National Electric Light Assn. Suggested Specifications D220–22, Flat Cross-Arm Brace D225–22, Alley Arm Brace D227–22, 26-inch Vertical Brace D228–22, 50-inch Vertical Brace. Above dated 1922. D230–24T, 1924, Tentative, Angle Cross-Arm Brace. D231–23, 1923, 6-foot Angle Cross-Arm Brace. Dimensions and allowable variations for steel braces, steel according to D200–22, galvanizing according to D210–22 of N. E. L. A. Published in 1924 N. E. L. A. proceedings.

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National Electric Light Assn. Suggested Specifications D282–28T; 1928. Tentative. Guy Wire Protector (Patented). Dimensions of 8-foot sheet steel guy protector attached with U-bolts, allowable variations, material in accordance with N. E. L. A. specifications D200–22, galvanizing in accordance with D210–22.

National Electric Light Assn. Suggested Specifications D283–22. Pole Guard. Dimensions and permissible variations for sheet steel pole guard, material according to N. E. L. A. specifications D200–22, galvanizing according to D210–22. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications D285–23; 1923. Guy Clamp. D290–22; 1922. Guy Clip (Crosby Pattern). Dimensions and allowable variations for 6-inch steel clamps and for 9 sizes of guy clips, material according to N. E. L. A. specifications D200–22, galvanizing according to D210–22, guy clips also according to general bolt specification D209–22. See 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications D280–22; 1922. Pole Step. Dimensions of 10-inch steel pole step with allowable variations, material according to N. E. L. A. specifications, galvanizing according to D210–22. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications D295–24T. Tentative. Guy Hook. For supporting guy cable, dimensions and allowable variations for one size of steel hook, material according to N. E. L. A. specifications D200–22, galvanizing according to D210–22. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications D298–22; 1922. Guy Plate. Dimensions of one size of sheet steel guy plate, allowable variations, steel in accordance with N. E. L. A. specifications D200–22, galvanizing in accordance with D210–22. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications D299–28T; 1928. Tentative. Molding Guy Plate. Sheet steel plate for protection of molding passing under guy wire on pole, shape, dimensions and permissible variations, material according to N. E. L. A. specifications D200–22, galvanizing according to D210–22.

National Electric Light Assn. Suggested Specifications D320–24T; 1924. Tentative. Spool Strap. Dimensions and allowable variations for sheet steel spool strap with pin for 3-inch length spool, material according to N. E. L. A. specifications D200–22, galvanizing according to D210–22. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications D322–28T; 1928. Tentative. Pressed Steel Split Clevis (Patented). D324–28T; 1928. Tentative. Drop Forged One Piece Clevis. Dimensions and allowable variations for two sizes of steel clevises of each type, for use with guy strain insulators, material according to N. E. L. A. specifications D200–22 and D209–22, galvanizing according to D210–22.

National Electric Light Assn. Suggested Specifications. D362–28T; 1928. Tentative. Ridge Pin Support. Sheet steel insulator pin support, design, dimensions and allowable variations, material according to N. E. L. A. specifications D200–22, galvanizing according to D210–22.

National Electric Light Assn. Suggested Specifications D415–22; 1922. Driving Point. Dimensions and allowable variations for 3 sizes of malleable cast driving points for ½ to 1 inch size pipe, material in accordance with N. E. L. A. specification D400–22. Published in 1924 N. E. L. A. proceedings.

National Electric Light Assn. Suggested Specifications D430–28T; 1928. Tentative 8-inch Anchor Plate. D431–28T; 1928. Tentative. 12-inch Anchor Plate. For anchor plates of malleable iron or of gray cast iron, dimensions and allowable variations.

National Electric Light Assn. Suggested Specifications D910–28T; 1928. Tentative Service Bracket. For steel clevis and strap type bracket used with small type spool insulator (D580–23), dimensions and allowable variations for 3 types, material according to N. E. L. A. specifications D200–22, galvanizing according to D210–22.

References.—Trolley line materials and construction. *See also* 719.63. Tubular steel poles. *See* 607.4. Wood poles, wood crossarms. *See* 401.3, 402.1. Wood insulators, glass insulators, porcelain insulators. *See also* 429.7, 526.1, 532.22. Metal insulator pins, wood insulator pins. *See* 719.61, 429.7. Metal supporting racks and cross connecting rings. *See* 719.61. Steel guy and messenger cable. *See also* 603.42. Eye bolts, machine bolts, carriage bolts. *See also* 608.31. Washers, round and square. *See also* 608.6. Methods of testing and general requirements for metals. *See also* 600.1, 600.3. Pole line construction, safety code. *See* 719.60. Steel towers for transmission lines. *See* 605.23.

719.63 Railway Trolley and Track Material

American Electric Railway Engr. Assn. Recommended rules, B101–25; 1925. Regulations for wiring of electric car houses and auxiliary buildings operated by electric traction companies. Supports, guards for trolley wires and third rails, minimum sizes of trolley wire, trolley feed and bond wires, and general wiring regulations.

American Electric Railway Engr. Assn. Recommended design D100–14; 1914. Diagram of Clearances For Overhead Working Conductors. Clearances between car running board and trolley wire for trainman giving signal and for cars without trainman.

American Electric Railway Engr. Assn. Recommended Specification, D101–16; 1916. American Standards Assn., C 15–1923. Recommended Specification For 600-Volt Direct Current Overhead Trolley Construction. Classification, design and erection of overhead trolley systems, including the supporting structures and systems, but not the material.

American Electric Railway Engr. Assn. Recommended Specifications D102–29; 1929 Overhead Line Material for Direct and Catenary Suspension. Includes steel oversupport rods and trolley wire supporting brackets of pipe or tubing, malleable iron fittings for support brackets, malleable iron ears, trolley frogs, crossings and suspensions, cast bronze trolley wire crossings, frogs, clinch ears, feed-in yokes. Requirements on construction, and dimensions except for frogs and crossings, strength of bronze, malleable castings according to A. S. T. M. spec. A–47.

American Electric Railway Engr. Assn. Recommended Design D103–24; as revised in 1927 on page 502 of Proc. of A. E. R. E. A. Ruling Dimensions for Through Suspensions. Dimensional drawing of hanger for trolley support.

American Electric Railway Engr. Assn. Recommended Specification D104–28; 1928. Catenary Overhead Construction for Other Than Steam Railroad Electrification. Definitions, spacing and setting of poles, attachment of spans and guys, types, design, and construction of supporting systems, design and installation of catenary systems, sag-tension-temperature curves, turnout and crossover designs.

American Electric Railway Engr. Assn. Recommended Specification D106–25; 1925. Specification For Overhead Line Construction For Trackless Trolleys Drawings of typical spans, line loops and wyes, trolley frogs and crossovers.

American Electric Railway Engr. Assn. Recommended Design D107–25; 1925. Devices for Temporary Connections To Trolley Wire. Drawings of two devices and illustrations of method of use, one requiring removal and the other not requiring removal when trolley car passes.

American Electric Railway Engr. Assn. W3–15; 1915. American Railway Engr. Assn. Standard Location of and Clearances for Third-Rail Working Conductors, Structures and Rolling Equipment. Diagram showing clearance lines for third-rail and permanent way structures and rolling equipment.

American Institute of Electrical Engineers Standard No. 16; 1925. Railway Control and Mine Locomotive Control Apparatus. Includes current collectors; definitions, classification, rating, heating limits and measurement, dielectric test requirements. Available in Spanish from Bureau of Foreign and Domestic Commerce of U. S. Dept. of Commerce.

American Institute of Electrical Engrs. Report on Standard 17g5. Joint sponsor with American Assn. for Advancement of Science, American Society of Civil Engineers, Society for Promotion of Engineering Education, and American Society of Mechanical Engineers under procedure of American Standards Assn. Graphical Symbols used for Electric Traction Including Railway Signalling. Committee report on symbols for electrical equipment in power houses, substations, transmission and distribution systems, electrically operated cars and locomotives, and in railway signalling.

American Railway Assn. Electrical Section. I–a–21; 1921. Definitions. Includes definitions of bond, bracket support, bridge support, catenary suspension, clearance line, contact conductor, contact conductor and rail, cross-span support, direct suspension, jumper, mandrel, pulling and splicing chambers, substation, third rail, etc.

American Railway Assn. Electrical Section. X–b–15; 1915. Clearance Lines for Equipment and Permanent Way Structures. Clearance requirements between equipment and third rail, between equipment and overhead contact wire, clearance lines for pantagraph, permanent way structure, etc.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No 248–215. Overhead Trolley Line Materials. Globe Strain Insulators. For 3 sizes, requirements on nominal diameter, tensile strength, voltage test, size of bolt with which used.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 248–216. Overhead Trolley Line Materials. Composition Strain Insulator. For 2 sizes, requirements on nominal diameter, tensile strength, voltage test, diameter of bolt with which used.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 248–217. Overhead Trolley Line Materials. Brooklyn Strain Insulator. For 2 sizes, requirements on tensile strength, voltage test, size of eye, dimension, threads and take-up of eye bolt, materials and coating of metal parts.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 248–218. Overhead Trolley Line Materials. Insulated Bolts. Requirements on dimensions of ⅝-inch insulated bolt, minimum insulation test voltage.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 248–219. Overhead Trolley Line Materials. Cap and Cone Insulators. One size, requirements on dimensions and minimum test voltage.

National Electrical Manufacturers Assn. Handbook of Supply Standards: 1927. No. 248–220. Overhead Trolley Line Materials. Insulated Straight Line Suspensions. For two sizes of round top hangers, requirements on tensile strength, insulation test voltage, dimensions, construction, hanger shell of malleable iron.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 248–221. Overhead Trolley Line Materials. Timber Roof Mine Suspensions, Rock Roof Mine Suspensions, Combined Mine Suspensions, Mine Suspensions for Pipe Attachments. For malleable iron shell construction, construction, dimensions, insulation test voltage requirements.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 248–225. Overhead Trolley Line Materials. Pole Brackets. Requirements on dimensions and threading of over-support rods, dimensions of beveled washer, dimensions and design of bracket pole castings for wood pole and for steel pole, of bracket intermediate castings, and outer end castings, for heavy service and for light service, castings of malleable iron, dimensions of pipe bracket arms.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 248–226. Overhead Trolley Line Materials. Feed In Yokes (Bronze). Requirements on construction, dimensions, and size of tap bolt.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 248–228 Overhead Trolley Line Materials. Clinch Trolley Ears. For brass ears, requirements on chemical composition, dimensions and construction, including strain ears.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 248–229. Overhead Trolley Line Materials. Uninsulated Pullover Bodies. For single and double types, requirements on design, and dimensions, material of malleable iron protectively coated.

National Electrical Manufacturers Assn. Handbook of Supply Standards; 1927. No. 248–231. Overhead Trolley Line Materials. Trolley Wire Splicers. General design requirements for a mechanical splice not using solder.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R65–31; 1931. Packaging of Overhead Electric Railway Material. Simplified practice recommended and accepted by industry covering standard number of units in package for protecting trolley armor, pole bands, fork bolts with insulators, cross-arm braces, crossings or crossovers, clinch ears, trolley frogs, insulators, cross-arm pins, pullovers, splicing sleeves, and line section switches.

References.—Poles and supporting material. *See also* 719.62, 719.61. Trolley wire. *See* 715.44. Track materials. *See* 606. Bronze castings, malleable iron castings. *See also* 646.41, 611.21. Methods of testing and general requirements for metals, zinc coatings. *See also* 600.1, 600.3.

719.64 Underground Circuit Materials

References.—Safety code for underground construction. *See* 719.60.

719.7 CUT-OUT BASES AND CONNECTORS

719.71 Cut-out Bases

References.—Cut-out bases. *See* 714.22.

719.72 Connectors and Clips

Society of Automotive Engineers 1931 Handbook. Cable, Conduit and Tubing Clips. Standard dimensions of 11 sizes of steel strap clips, standard design.

Society of Automotive Engineers 1931 Handbook, Heavy Duty Connectors; 1927. Dimensions of standard triple contact bayonet socket, triple contact plug, double contact bayonet socket, double contact plug, insulating caps for connectors, dimensions of base, socket, and plug gages, dimensions of single contact, double contact, and triple contact, screw type socket or connector.

Underwriters' Laboratories. Ground Clamps; 1918. For use with ground wires up to No. 4 B. & S. gage in connection with conduit or pipe up to 2-inch size, required area of contact for flat bands, thickness, material and width of sheet metal clamps, protection against corrosion.

References.—Sockets and plugs. *See also* 715.21. Fuse clips. *See* 714.22.

719.9 MISCELLANEOUS ELECTRICAL MACHINERY AND SUPPLIES

719.91 Electric Welding Apparatus

References.—Electric welding machines and apparatus. *See* 767. Helmets and goggles. *See* 914.5.

720–729 VEHICLES, EXCEPT AGRICULTURAL VEHICLES AND STEAM LOCOMOTIVES

721. ELECTRIC VEHICLES

721.1 ELECTRIC LOCOMOTIVES

American Mining Congress. Mine Locomotives (Coal Mines); 1928. Does not include combinations of trolley and storage battery types. Standard d. c. voltage ratings and weights for trolley type and storage battery type locomotives, drawbar pull, locomotive and motor rating methods.

American Mining Congress, under auspices of American Standards Assn. M 18–1928; Underground Transportation in Metal Mines. Includes standard weight of locomotive for motor haulage.

American Railway Assn. Mechanical Div. Recommended Practice. Standard Method of Rating Electric Locomotives; 1930. Requirements on data to be given in standard ratings for maximum start, one hour, and continuous ratings, one hour motor ratings to start with motor cold, reduction in motor torque adopted for determining tractive effort, formulas for tractive effort and miles per hour.

National Board of Fire Underwriters. Electric Railway Car Houses and Cars; 1925. Electric wiring requirements, for electric railway cars and locomotives, permissible voltages for lighting circuits, type of conduit, size and installation of ground wire, minimum sizes of conductors, rules of installation, enclosures for control devices, kind of insulation, sizes of fuses.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 116–201. Mining Locomotives, Trolley Type. Standard basis of motor rating, standard voltage ratings and locomotive weights, requirements on permissible temperature rise, on method of determining draw bar pull, on contour of wheel, recommended standard track gages and standard brushes and brush shunts.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 116–420. Mining Locomotives, Storage Battery Type. Recommended practice on weight, draw bar pull, speed, and motor power ratings, and on maximum size of battery, requirements on permissible temperature rise, contour of wheel, method of determining draw bar pull.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 116–517. Industrial Locomotives, Trolley or Third Rail Types. Standard voltage ratings, recommended practice on locomotive weights, single and double trucks, number and horsepower of motors, and locomotive speed, requirements on permissible temperature rise, type of control equipment, wheel contour, recommended size of air compressor.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 116–547. Industrial Locomotives, Storage Battery Type.

Recommended practice on motor rating for different weights of locomotives, on determination of weight of locomotive, on determining nominal draw bar pull, on type of control equipment, requirements on permissible temperature rise, wheel contour, etc.

U. S. Gov., Congress. Public, No. 113; 1893; amended 1896. An act to promote the safety of employees and travelers upon railroads by compelling common carriers engaged in interstate commerce to equip their cars with automatic couplers and continuous brakes and their locomotives with driving-wheel brakes, and for other purposes. Besides above, there are requirements for appliances on locomotives for operating the train brake system, provision of grab irons and handholds, and standard height of drawbars.

U. S. Gov., Dept. of Commerce, Bureau of Mines Schedule 2C; 1930. Explosion Proof Mine Equipment. Storage Battery Locomotives and Power Trucks. Requirements for approval for use in gassy or dusty mines, including requirements on provision of explosion-proof inclosures for motors, controllers, fuses, switches, headlights, meters, rheostats, electromagnets, etc., on automatic protection of circuits and batteries, on attachment, insulation, and protection of conductors, grounding of parts, construction of inclosing casings, explosion tests for inclosures, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards H7; 1926. Approved by American Standards Assn. as part of C 2–1927. (National Electrical Safety Code.) Safety Rules for the Installation and Maintenance of Electric Utilization Equipment. For industrial electrical locomotives, requirements on guarding live and moving parts, types of power disconnecting means, provision of locking or removable operating handles.

U. S. Gov., Interstate Commerce Commission. Bureau of Locomotive Inspection. Laws, Rules, and Instructions for Inspection and Testing of Locomotives Other Than Steam; 1926. Requirements mandatory by law, regarding provision and capacity of safety valves for air brake reservoir, operating characteristics of compressor governor and testing of air brake compressors and reservoirs, maximum brake cylinder travel, lost motion in articulated connections or between chafing irons or couplers, permissible side motion and fit requirements at pin and rod bearings, perissible lateral motion in wheel bearings, intermembering of truck center plates, clearance of side bearings, uniform diameter of wheels, pressing of wheels on axle, minimum width of tires, windows in cab, cab heating, location of cab lights, of whistles, bells, and sanders, locking and grounding of pantagraphs, voltage test of jumpers, provision of safety cut out valve for fuel, grounding of tanks, and provision for starter for internal combustion engines, for boilers the minimum allowed factor of safety, permissible stresses in stay bolts and braces, design strength of materials and rivets, inspection and hydrostatic test of boiler, testing of stay bolts, location, testing and connection of steam gauges, number, location, and setting of safety valves, water glass and gauge equipment, connection of tubes into tube sheets of feed water appliances, etc., permitted wear limits and defects appearing in service.

References.—Railway motors. *See also* 711.3. Storage batteries and containers. *See also* 712.2, 712.3. Locomotive control apparatus. *See also* 714.11. Motor rating basis, standard voltages, methods of testing, safety codes for electrical equipment. *See also* 710. Safety devices for locomotives. *See also* 726.2. Brake systems and miscellaneous car parts. *See also* 726.2. Structural steel for locomotives. *See also* 605.13. Cast-iron wheels, cast-steel wheels, forged steel wheels and tires. *See also* 611.18, 611.49, 611.53. Journal boxes, bearings. *See also* 611.22, 692.3. Brake beams, brake shoes. *See also* 611.42, 611.43. Couplers and cast steel parts. *See also* 611.44, 611.49. Axles, steel forgings. *See also* 611.51, 611.52. Valves. *See also* 607.6, Locomotive headlights, wiring for locomotives. *See also* 716.2, 715.30. Turbo-generator for locomotive lighting. *See also* 711.12. Tolerances for metal fits. *See also* 615.82.

721.2 ELECTRIC AUTOMOBILES AND TRUCKS

Railway Fire Protection Assn. Handbook; 1925. Electric Trucks and Tractors in Freight Depots and Terminals. For trucks and tractors approved by Underwriters Laboratories, requirements on nonarcing of controllers, installation of wiring and resistors, fusing, cutout switch operated by weight of operator, inclosure of contacts and charging connections, inclosed motor, etc.

Society of Automotive Engineers 1931 Handbook. Battery Tray Terminal Lugs; 1925. Dimensions of three sizes of terminals with corresponding size of steel bolt.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Battery Trays for Electric Commercial Vehicles. Tray dimensions and tray arrangements for lead-acid batteries and for nickel-iron batteries.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Brakes, Industrial Truck and Tractor. Brakes to be released by depressing the brake pedal and applied by removing the foot.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Clearance Radii, Industrial Truck and Tractor; 1920. Definition of outside and of inside clearance radius.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Electric Vehicle Battery Cells; 1915. For electric passenger cars and trucks, specifies the number of cells for both lead-acid batteries and nickel-iron storage batteries.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Electric Vehicle Ratings; 1916. Speed and mileage ratings defined.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Storage Battery Trays for Industrial Truck and Tractor; 1920. One type of 12-cell tray for lead batteries, one tray unit for industrial trucks and two tray units for tractors.

U. S. Gov., Dept. of Commerce, Bureau of Mines Schedule 2C; 1930. Explosion Proof Mine Equipment. Storage Battery Locomotives and Power Trucks. Requirements for approval for use in gassy or dusty mines, including requirements on explosion proof inclosure provision for motors, controllers, fuses, switches, headlights, meters, rheostats, electromagnets, etc., on automatic protection of circuits and batteries, on attachment, insulation, and protection of conductors, grounding of parts, construction of inclosing casings, explosion tests for inclosures, etc.

References.—Electric vehicle motors. *See also* 711.22. Storage batteries and containers. *See also* 712.2, 712.3. Controllers. *See also* 714.11. Definitions, symbols, rating basis and methods of testing motors. *See also* 710. Automobile parts and accessories. *See also* 722.3. Wiring for electric automobiles. *See also* 722.32. Charging plug and receptacle. *See also* 715.21. Industrial truck tire and rim sizes. *See* 206.5. Tolerances on metal fits. *See also* 615.82.

722. MOTOR TRUCKS AND AUTOMOBILES, EXCEPT ELECTRIC

722.0 GENERAL ITEMS

National Conference on Street and Highway Safety. Uniform Vehicle Code; 1930. Act IV—Uniform Act Regulating Traffic on Highways.

Act proposed for enactment by the States includes requirements on equipment of automobiles such as number and illuminating efficiency of lamps, provision and efficiency of horns, mirrors, windshield wipers, and mufflers, limitations on width, height, and weight of vehicles, tire requirements.

Society of Automotive Engineers 1931 Handbook. Automobile Nomenclature; 1930. Standard names for the parts of an automobile and for body types arranged under 19 headings.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Turning Radius; 1927. Definition of turning radius for automotive vehicle.

Society of Automotive Engineers 1931 Handbook. Weight of Vehicle; 1916. Definition of what constitutes the weight of a motor vehicle.

722.1 AUTOMOBILE MOTOR TRUCKS

National Fire Protection Assn. Recommended Practice for Construction and Operation of Automobile Gasoline Tank Trucks; 1929. Requirements on thickness of steel plates for various capacity tanks, structural features of tanks, air pressure test, division into compartments, emergency and discharge control, safeguards for truck fuel system, electrical equipment, and exhaust systems, grounding requisites.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Body Hold-Down Clamps; 1923. Requires use of U-clamps and wood filler blocks and not drilling of frames for hold-down clamps for motor trucks.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Motor-Truck Dump-Bodies; 1929. Dump bodies larger than 1½ cu. yd. to be hand-hoist or power-hoist operated.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Motor Truck Frames; 1926. Frame width for straight and offset frames for speed wagons and various capacity trucks.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Vertical Dumping-Hoist Platforms; 1923. Requires that mounting holes be drilled on neutral axis of frame section.

References.—Fire trucks. *See* 722.2. Truck accessories and parts. *See* 722.3. Power take off. *See* 722.34. Propeller shaft midship mountings. *See* 722.34. Motor truck frames. *See* 722.37.

722.2 AUTOMOBILE FIRE TRUCKS

National Board of Fire Underwriters. Fire Engine Tests and Fire Stream Tables; 1931. For determining the condition of automobile fire engines or for acceptance tests for new engines, requirements on service test procedure, types of test apparatus, tabulation of data, computation of results. Tables showing discharge characteristics and pressure head requirements for various lengths of hose.

National Board of Fire Underwriters. Suggested Specifications; 1928. Gasoline Automobile Fire Apparatus. Combination pumping engine and hose wagon, combination hose wagon, combination service ladder truck, aerial ladder truck, standard sizes of pumpers, power requirements of engine, axle ratio, dual ignition system, requirements on accessories, capacity and other requirements for gasoline, chemical, and water tanks, carrying capacities of hose wagons, list of fire equipment to be carried, road test and pumping test requirements.

National Fire Protection Assn. Rural Fire Departments, Equipment and Organization; 1929. Includes motorized combination pumping engine and hose cart, requirements on load carrying capacity of gasoline motor, permissible types of pumps, hydrostatic pressure and load test of pump, protection against corrosion, types and arrangement of connections, ignition, clutches, brakes, lubrication, etc.

References.—Industrial automobile trucks. *See* 722.1. Truck accessories and parts. *See* 722.3. Stationary fire pumps. *See* 755.1. Other fire extinguishing equipment and supplies. *See* 970 to 979.

722.3 AUTOMOBILE ACCESSORIES AND PARTS

722.31 Automobile Power-Plant Parts

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Carbureter Air-Horn Dimensions for Air-Cleaner Mounting; 1928.

Society of Automotive Engineers 1931 Handbook. Carbureter Flanges; 1923. Dimensions of flanges, bolt holes and threads for two-bolt, three-bolt, and four-bolt types.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Carbureter Flanges, Duplex Type; 1928. Dimensions of 4 and 6 bolt flanges for one to two inch sizes.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Carbureter Intakes; 1921. Nominal inside diameter to vary by even ¼ inch.

Society of Automotive Engineers 1931 Handbook. Engine Rear Support Arms; 1929. Standard bolt hole spacing and dimensions of support arms for 5 sizes of support arms, 1 tractor size.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Engine Trunnions; 1926. Diameters and lengths of two sizes each for starting-crank bracket type and gear cover type.

Society of Automotive Engineers 1931 Handbook. Fan Belts and Pulleys; 1928. Dimensions of pulleys for various widths of V-fan belt and flat belt, dimensions of pulley spindles for slotted fan-brackets, dimensions of flat and V-belt fan assemblies.

Society of Automotive Engineers 1931 Handbook. Flywheel and Clutch Housings; 1929. Dimensions, cap screw sizes, and tolerances on bore and eccentricity, for seven sizes.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Fuel Pump Mounting Flanges; 1929. Recommended dimensions and bolt hole spacings for standard mounting flange for reciprocating pump and for standard flange for rotary type pump.

Society of Automotive Engineers 1931 Handbook. Hood-Ledge Lacings; 1928. Width and thickness, impregnation and weave requirements for cotton woven material.

Society of Automotive Engineers 1931 Handbook. Piston and Piston-Ring Oversizes; 1926. Standard oversizes.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Piston-Pin Diameters; 1925. Finished to even $\frac{1}{16}$-inch diameters with two standard oversizes.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Piston Ring Widths; 1926. Standard tolerance for the nominal piston ring width.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Poppet Valves; 1925. Dimensions of valve heads and valve stem tips, hardness requirement for valve stem tips.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Radiator Shutters; 1926. Minimum distance between radiator core and head-lamp tie rod specified to permit application of shutters.

Society of Automotive Engineers 1931 Handbook. Radiators; 1929. Dimensions of inlet and outlet fittings, of tie rod fittings, of tapped drain hole, of header plates, of hood ledge, of header flange, and pressure test requirements for cast-type radiators, dimensions of copper or brass overflow tube for tubular radiators, requirements for tie rods and hood ledges for shell-type radiators.

Society of Automotive Engineers 1931 Handbook. Rubber Hose, Clamps and Fittings; 1916. Inside and outside diameters of hose, inside diameters of clamps, for 1 to 4 ply hose, length of fitting.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Starting Cranks; 1926. Dimensions of fittings for starting crank shaft and for engine crank shaft for four jaw type, heavy pin type, and light pin type.

Society of Automotive Engineers 1931 Handbook. Thermostat Connections; 1918. Cooling medium thermostats, rubber hose connections to conform to dimensions of S. A. E. standard clamps and fittings for rubber hose, metallic connections to conform to dimensions of 2-bolt carbureter flanges.

Society of Automotive Engineers 1931 Handbook. Vacuum Brake Manifold Connection; 1928. Standard tapped hole, ⅜-inch pipe thread.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Water Pipe Flanges; 1926. Dimensions of standard 2-bolt flanges and standard sizes of cap screws.

References.—Flexible carbureter and exhaust steel tubing. *See* 607.7. Acetylene head lamp. *See* 722.33, Crank case drain plug. *See* 607.14. Engine test codes. *See* 705.0, 700. Tolerances on metal fits. *See also* 615.82.

722.32 Automobile Electrical Equipment

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Society of Automotive Engineers 1931 Handbook. Magneto Mountings; 1923. Dimensions of magneto coupling and shaft end, dimensions of mounting, for motor truck and passenger cars.

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Society of Automotive Engineers 1931 Handbook. Starting Motor Mountings; 1929. Dimensions and layout of bolt holes for two standard flange type mountings. Recommended Practice for medium duty outboard installations, for heavy duty outboard installations and for barrel type outboard installations, standard inboard installation.

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Society of Automotive Engineers 1931 Handbook. Recommended Practice. Tail-Lamp Construction; 1930. General requirements on rigidity, weather and dust proofness, covering of license plate window.

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References.—Storage batteries. *See* 712.2. Storage battery containers and jars. *See* 712.3. Storage battery terminals. *See* 712.9. Storage battery trays and tray terminals for electric vehicles. *See* 721.2. Electric vehicle motors. *See* 711.22. Charging plug and receptacle. *See* 715.21. Ignition coil and timer test. *See* 713.6. Fuses and fuse clips. *See* 714.21, 714.22. Rubber bushings. *See* 209.7. Flexible steel conduit and tubing. *See* 715.11. Nonmetallic conduit. *See* 715.13. Insulated cable, magnet wire. *See* 715.41, 715.44. Lamp lenses. *See* 525.4. Incandescent lamps, optical tests of head lamps and tail lamps. *See* 716.12. Bases, sockets, and plugs. *See* 715.21, 716.12. Connectors. See 719.72. Spark plugs and terminals. *See* 719.4. Breaker contacts. *See* 714.51. Starting motor pinions. *See* 611.55. Insulation test. *See* 710. Starting motors, automobile generators. *See* 711.22, 711.12. Motor and generator brushes. *See* 711.42. Meter binding posts. *See* 714.37. Cable terminals, cable and conduit clips. *See* 715.34, 719.72. Flexible conduit ferrules. *See* 715.11. Motor coach lighting. *See* 716.39.

722.33 Automobile Parts and Fittings

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Society of Automotive Engineers 1931 Handbook. Recommended Practice. Ball Studs; 1922. Dimensions of ball stud and of ball stud and nut assembly for sizes up to 3 inches.

Society of Automotive Engineers 1931 Handbook. Connecting-Rod Bolts; 1920. Dimensions and recommended steel and hardness test.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Front Bumper Mountings; 1929. Recommended location of bolt holes on frame side member for attachment of bumper bracket.

Society of Automotive Engineers 1931 Handbook. Fuel and Lubrication Tube Fittings; 1925. Dimensions of soldered type sleeve and nut fittings, of flared type fittings, of compression type sleeve and nut fittings for tubes up to ½ inch.

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Society of Automotive Engineers 1931 Handbook. Passenger Car Bumpers; 1929. Standard heights of front and rear bumpers above ground, overall dimensions, plane of faces of mounting pads, etc.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Pressure Gage Connections; 1922. Thread and dimensions of screw connection for three sizes of tubing.

Society of Automotive Engineers 1931 Handbook. Rod Ends and Pins; 1927. Dimensions of adjustable and nonadjustable yoke and eye rod-ends for light and heavy grades, dimensions of rod-end pin and of cotter pin.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Serrated Shaft Fittings; 1922. Dimensions of hole, shaft, and serrating for straight type and for taper type fittings.

Society of Automotive Engineers 1931 Handbook. Spline Fittings; 1920. Four, six, ten, and sixteen spline fittings, dimensions and torque capacities of 3 classes of fittings, permanent fit, slide fit when unloaded, and slide fit when loaded.

Society of Automotive Engineers 1931 Handbook. Square Fittings; 1921. Dimensions of squared rod, fitting, threaded section, and nut for slip fit and for permanent fit joints, work capacity of fittings at given pressures.

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Society of Automotive Engineers 1931 Handbook. Recommended Practice. Tank and Radiator Caps; 1922. Dimensions.

Society of Automotive Engineers 1931 Handbook. Taper Fittings with Plain or Slotted Nuts; 1928. Dimensions of tapered section, threaded section, key, keyway, slotted nut, plain nut, cotter pin.

References.—Drain cocks. *See* 645.4. Wire cloth. *See* 603.43, 645.39. Ball bearings, roller bearings. *See* 766.2. Screw threads and tap drill sizes. *See* 608.0. Cap screws, machine screws, wood screws. *See* 608.2. Bolts, nuts. *See* 608.31, 608.32. Wrench openings. *See* 615.42. Lock washers, plain washers. *See* 608.6. Cotter pins. *See* 608.51. Woodruff keys, key slots, keyways. *See* 608.52. Split and tubular rivets. *See* 645.9. Brake lining. *See* 722.38. Lubricator cups, oil and grease cups, threads. *See* 794. Tolerances for metal fits. *See also* 615.82.

722.34 Automobile Transmission Parts

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Clutch Facings; 1929. For multiple disk clutch and single disk clutch, dimensions of woven type and of molded type facings.

Society of Automotive Engineers 1931 Handbook. Control and Gearshift Positions; 1929. Diagrams showing gear shift lever positions for 3-speed and for 4-speed transmission, and for motor trucks the location of gearshift, brake, clutch, accelerator levers and pedals, and of hand throttle and spark levers.

Society of Automotive Engineers 1931 Handbook Control Lever Handle-Balls; 1926. Thread and length of thread on the upper end of control lever, one for passenger cars and one for trucks, for gear shift lever.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Differentials; 1925. Dimensions of 10-tooth and 11-tooth pinions and of 18-tooth and 20-tooth side gears for both case and spider mounting, dimensions of spiders and gear cases for the two types of mounting.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Flexible Disks; 1927. Dimensions of 6, 8, and 12-hole metallic shaft coupling disks and of 4-hole non-metallic shaft coupling disk.

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Society of Automotive Engineers 1931 Handbook. Recommended Practice. Propeller Shaft Midship Mounting; 1927. Dimensions of 3-joint propeller shaft midship mounting for motor trucks.

Society of Automotive Engineers 1931 Handbook. Tire Pump Mounting, Transmission Type; 1922. Dimensions of small mounting and large mounting.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Universal Joint Hubs; 1921. Dimensions of hubs up to 2-inch size.

References.—Silent chain, roller chain, roller chain sprocket. *See* 766.1. Roller and sprocket chain cutters. *See* 765. Tractor power take off speed. *See* 729.5. Tractor belts and pulleys. *See* 729.5.

722.35 Automobile Axles and Wheels

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Tenon Holes for Steel Felloes; 1923. Wood spoke size and tenon hole diameter for four pneumatic tire diameters.

References.—Rims, cleats, and lugs for tractor wheels. *See* 729.5.

722.36 Automobile Tires and Rims

Society of Automotive Engineers 1931 Handbook. Solid Tire Base-Bands; 1929. Standard dimensions and design of 12 sizes of base bands from 3 to 16 inch sizes.

Society of Automotive Engineers 1931 Handbook. Solid Tire Felloe-Bands; 1926. Dimensions of bands and wood felloes for solid tire equipment, allowable felloe-band tolerances.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Dual Spacing for Truck and Motorcoach High Pressure and Balloon Tires; 1931. Center to center spacing of tires and rims for sizes up to 10-inches, for dual tires. Conforms to standards of Tire and Rim Assn. adopted in 1929.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Industrial Truck Tires; 1931. Tire widths and wheel diameters for flat base tires and for channel base tires, for nominal wheel diameters from 5 to 24 inches, dimensions of base bands, maximum loads. Conform to standards of Tire and Rim Assn.

Society of Automotive Engineers 1931 Handbook. Tire and Rim Sizes; 1931; Standard tire sizes and rim diameters for balloon tires for passenger cars, dimensions of standard sizes of rims; standard tire and rim sizes and rim dimensions for balloon and high pressure tires for motor trucks and motorcoaches. Conform to standards of Tire and Rim Assn.

Tire and Rim Assn. (Inc.). 1931 Year Book. Passenger Car Tires, Truck and Bus Tires. Includes standard rim sizes for the various standard tire sections for passenger cars, and standard rim dimensions for truck and bus tires.

Tire and Rim Assn. (Inc.). 1931 Year Book. Solid Tires; 1928. Includes solid tire base bands, dimensions of standard sizes for motor trucks, tentative standard base band circumferences.

Tire and Rim Assn. (Inc.). 1931 Year Book. Standard Rim Contours. Dimensions of standard rim contours for various standard sizes of straightside, drop center, semi-drop base split, and clincher passenger car rims, and for truck and bus rims, tolerances on dimensions, gages for above rims, rim diameters and circumferences.

References.—Rubber tires, casings and inner tubes. *See* 206. Passenger car brake drums. *See* 722.38.

722.37 Automobile Frames, Bodies, and Body Parts

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Running Board Brackets; 1923. Dimensions.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Door Locks and Handles for Passenger Car Bodies; 1923. Requirements for sizes and spacing of screws in escutcheon plates, angle between sides of lock face plates, size and clearance of bar door handles, dimensions of door handle squares, etc.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Front Bumper Mountings; 1924. Location of mounting bolt holes on frame.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Hinge Rods; 1923. Size of top and side hinge rods for engine hoods.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Top-Bow Supports; 1923. Requirements on threading of threaded end and length of stud.

References.—Leaf springs, rebound clips, center bolts. *See* 611.54. Upholstery leather. *See* 066.7. Plate glass. *See* 521.1. Aluminum belt body molding. *See* 631.22. Aluminum body sheets. *See* 631.23. Door hinges. *See* 617.12. Truck bodies and frames. *See also* 722.1. Body types, nomenclature. *See* 723.0.

722.38 Automobile Control Equipment

American Automobile Assn. Joint sponsor with Nat. Bureau of Standards under procedure of American Standards Assn. A. S. A. serial D4–1927. Safety Code for Automobile Brakes and Brake Testing. Minimum acceptable retardation for various types of motor vehicles under the action of brakes, methods of making actual service tests of brakes.

Society of Automotive Engineers 1931 Handbook. Brake Lining, 1926. Width and thickness up to 6-inch width.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Brakes, Industrial Truck and Tractor. Brakes to be released by depressing the brake pedal and applied by removing the foot.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Carbureter Throttle Levers; 1925. Size and throw of throttle lever, diameter and threads of rod-end for carbureters up to 3½ size.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Passenger Car Brake Drums; 1924. Diameters, maximum height of wall and maximum eccentricity, for 9 sizes.

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U. S. Gov., Dept. of Commerce, Bureau of Standards R66; 1927. Automobile Brake Lining. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes of brake linings, covering widths and thicknesses.

U. S. Gov., Federal Specifications Board. HH–L–361; 1931. Brake Band Linings. Requirements on flexibility, uniformity of composition, standard widths, thicknesses and tolerances, rating test on Bureau of Standards brake-lining testing machine for value and uniformity of coefficient of friction, smoothness of operation, resistance to stresses and heat, scoring of drum, durability, giving of service ratings to samples on "rating list."

References.—Steering gear, connecting rods, ball studs, ball and socket joints. *See* 722.33.

722.39 Miscellaneous Automobile Accessories and Parts

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Laboratory Tests of Optical Characteristics of Reflex Reflectors for Motor Vehicles; 1931. A signal reflecting the light of an approaching vehicle, set-up and method of test, required intensity of reflected light for normal position and for angular positions.

Society of Automotive Engineers 1931 Handbook. License Plate Bracket Slots; 1930. Dimensions.

Society of Automotive Engineers 1931 Handbook. License Plate Holes; 1930. Standard Location and sizes of mounting holes for license plates less than 11 inches in length and for license plates over 11 inches in length.

References.—Lubricating oils. *See* 504.34. Felt. *See* 365.98. Rubber hose, clamps and fittings. *See* 202.43.

723. AUTOMOBILE PASSENGER CARS, EXCEPT ELECTRIC CARS

723.0 GENERAL ITEMS

American Electric Railway Engr. Assn. Misc. Methods and Practices. E215–26; 1926. Rules for Inspection of Buses. List of recommended inspections for given definite mileages with sample form for chauffeurs report on condition of bus.

Society of Automotive Engineers 1931 Handbook. Automobile Nomenclature; 1930. Includes definitions and illustrations of standard body types, as roadster, phaeton, touring car, coupe, coach, sedan, and variations from above.

723.1 AUTOMOBILE PASSENGER CARS

723.11 Automobile Coupes

References.—Definitions, parts and accessories. *See* 723.0, 722.3.

723.12 Automobile Runabouts and Roadsters

References.—Definitions, parts and accessories. *See* 723.0, 722.3.

723.13 Automobile Sedans

References.—Definitions, parts and accessories. *See* 723.0, 722.3.

723.14 Automobile Touring Cars

References.—Definitions, parts and accessories. *See* 723.0, 722.3.

723.15 Automobile Ambulances

References.—Parts and accessories. *See* 722.3.

724. AIRCRAFT

724.0 GENERAL ITEMS

American Standards Assn. Z 10e–1930. Aeronautical Symbols. Sponsor organizations, Am. Assn. for Advancement of Science, Am. Inst. of Elec. Engrs., Am. Soc. of Civil Engrs., Soc. for Promotion of Engineering Education, Am. Soc. of Mech. Engrs. Standard symbols for quantities used in the design of aircraft.

U. S. Gov., Dept. of Commerce. Aeronautics Branch. Aero. Bull. 7–A; 1929. Airworthiness Requirements of Air Commerce Regulations. Requirements that must be met by conventional types of airplanes in order to be licensed by Dept. of Commerce for general commercial service, including structural features such as number of exits, provision of firewall, location and strength of fuel tanks, piping, protection of electrical equipment, clearance of propellers, etc.; load factors to be used for design calculations, computation of wing loads, etc.; design loads for light aircraft; required practice in construction and design of wings, fuselage, landing gear, fittings, control system, etc.; ignition requirements for engine, block and flight tests and teardown inspection of engine; power absorption and whirl test of propellers.

References.—Gas welding of aircraft joints, procedure. *See* 767. Airdromes and landing fields. *See* 518.51.

724.1 BALLOONS

Society of Automotive Engineers. Aeronautic Safety Code; 1925. Approved by American Standards Assn. as D1–1925. Balloons, Free and Captive. Requirements on safety factors on envelope bursting strength and strength of rigging, capacities of valves and rip panel, weight of drag rope, control cord attachment, standard dimensions and resultant stresses in material for 7 sizes of coal gas filled spherical balloons, recommended instruments and equipment, inflation and deflation rules, operating rules.

724.2 AIRCRAFT ACCESSORIES AND PARTS

724.21 Aircraft Power-Plant Parts

Society of Automotive Engineers. Aeronautic Safety Code; 1925. Approved by American Standards Assn. as D1–1925. Part 2, Powerplants. Requirements on use of dual ignition, starting means, design of intake system, engine characteristic test, durability test, idling test, over-speed test, and flight test, pressure tests and arrangement of fuel and oil tanks and piping, design and efficiency of cooling system, location and motion of engine controls.

Society of Automotive Engineers 1931 Handbook. Engine-Starter Mounting, Aeronautic; 1928. Dimensions of starter motor mounting flange, for large type and small type mountings.

Society of Automotive Engineers 1931 Handbook. Fuel Pump Mounting, Aeronautic; 1928. Dimensions.

Society of Automotive Engineers 1931 Handbook. Magneto Mountings, Aeronautic; 1929. Dimensions of generator mounting flange.

Society of Automotive Engineers 1931 Handbook. Magneto Mountings, Aeronâutic; 1929. Dimensions for mounting flanges and bolt holes for standard mountings for two bolt and three bolt flanged type mountings.

References.—Aeronautic spark plugs. *See* 719.4. Aircraft storage batteries. *See* 712.2. Requirements for engine. *See also* 724.0. Tolerances for metal fits. *See also* 615.82.

724.22 Aircraft Parts and Fittings

Society of Automotive Engineers 1931 Handbook. Plain Pulley Spacers, Aeronautic; 1930. Standard dimensions of 2 sizes of spacers of cylindrical form, size of bolt required.

Society of Automotive Engineers 1931 Handbook. Pulleys, Nonmetallic. For aeronautic equipment, dimensions of 5 standard sizes of plain bearing pulleys and of 4 standard sizes of antifriction bearing pulleys for flexible cable up to $\frac{3}{16}$-inch size, side bearing test for antifriction bearing type.

Society of Automotive Engineers 1931 Handbook. Rigid Terminals for Airplane Stays; 1928. Dimensions of hole and slot terminals for various sizes and specified minimum tensile strengths, bend test requirements.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Shock-Absorber Strut-Ends, Aeronautic. Standard dimensions of 12 strut ends for static loads up to 12,000 pounds, for steel of 125,000 pounds strength.

Society of Automotive Engineers 1931 Handbook. Streamline Tie Rods and Internal Tie Rods, Aeronautic; 1930. Standard dimensions, cross-sectional shape, and threading of various strength sizes of each type.

Society of Automotive Engineers 1931 Handbook. Tachometer Drive, Aeronautic; 1929. Standard dimensions of engine end connection and of instrument end connection of tachometer drive shaft, dimensions of engine tachometer shaft and of tachometer connection.

Society of Automotive Engineers 1931 Handbook. Tail-Skid Shoe Mountings; 1928. For airplanes under 4,500 pounds weight, dimensions and location of mounting holes.

U. S. Gov., Dept. of Commerce. Aeronautic Branch. Aero. Bull. 7–A; 1929. Airworthiness Requirements of Air Commerce Regulations. Design requirements for fittings, tie-rods and wires, landing gear, wings, etc., which must be met in order to obtain license from Dept. for commercial use of airplane.

724.23 Aircraft Wheels

Society of Automotive Engineers. Aeronautic Safety Code; 1925. Approved by American Standards Assn. as D1–1925. Landing Gear. Includes requirements on wheel size, maximum loading on wheels, and general design of wheel bearings.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Airplane Wheel Rims; 1929. Recommended standard dimensions for 7 rim sizes.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Airplane Wheels and Axles; 1929. Recommended dimensions of plain bearing wheel hubs and axle ends for 10-wheel sizes, recommended dimensions of antifriction bearing wheel hubs and axle ends for 3 sizes of tail wheels and 7 sizes of landing wheels.

Tire and Rim Assn. (Inc.). 1931 Year Book. Airplane Tires; 1931. Standard airplane tire and wheel combinations, recommended practice on axle, rim, and tire dimensions, load, inflation, and valve equipment for low pressure and extra low pressure airplane tires.

Tire and Rim Assn. (Inc.). 1931 Year Book. Standard Rim Contours. Dimensions and tolerances for standard airplane rims for 3-inch to 14-inch sizes, gage for above rims, recommended practice on dimensions of low pressure airplane rims.

References.—Airplane tires. *See* 206.2.

724.24 Aircraft Propellers

Society of Automotive Engineers. Aeronautic Safety Code; 1925. Approved by American Standards Assn. as D1–1925. Propellers. Permissible tolerances on dimensions, clearance distances and operation requirements, whirl test.

Society of Automotive Engineers 1931 Handbook. Recommended Practice; 1929. Propeller Blade Clamp Rings, Bolts and Nuts. Recommended dimensions of 2 bolt sizes and 4 clamp ring sizes, S. A. E. steel specifications which apply to each, tensile and hardness test requirements for steel, for aircraft propellers.

Society of Automotive Engineers 1931 Handbook. Propeller Blade Ends; 1929. Standard dimensions of 6 sizes of aluminum alloy propeller blade ends for aircraft engines.

Society of Automotive Engineers 1931 Handbook. Propeller Hubs and Shaft Ends. Splined Shafts; 1929. Standard dimensions of splined shaft end and hub using 16 splines, for 4 shaft sizes for aircraft engines.

Society of Automotive Engineers 1931 Handbook. Propeller Hubs and Shaft Ends. Taper Shafts; 1930. For 3 standard taper shaft ends, dimensions of shaft end and key, threads in general use on shaft.

U. S. Gov., Dept. of Commerce. Aeronautics Branch. Aero. Bull. 7–A; 1929. Airworthiness Requirements of Air Commerce Regulations. For propellers, power absorption and whirl test requirements, and general requirements on approval of design in order that license may be issued for commercial use of airplane.

724.25 Aircraft Control Equipment

Society of Automotive Engineers. Aeronautic Safety Code; 1925. Approved by American Standards Assn. as D1–1925. Control Arrangements. For pilot's control, requirements on type, direction of motion of control, provision against jamming, provision of stirrups or foot rests on foot-bar or pedals, permissible types of control connections, guiding of cables, maximum force to operate controls.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Airplane Stick Control; 1917. Drawing showing arrangement and function of parts for controlling altitude, balance and direction of flight.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Airplane Wheel Control. Undated. Drawing showing arrangement and function of parts for controlling altitude, balance and direction of flight.

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724.26 Aeronautical Instruments

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Aircraft Instrument Cases and Mountings; 1929. Recommended basic mounting and case dimensions for 1⅞-inch and for 2¾-inch dial instruments.

Society of Automotive Engineers 1931 Handbook. Tachometer Drive, Aeronautic; 1929. Dimensions and threading of standard engine tachometer shaft connection, engine end of tachometer drive shaft, tachometer connection, and instrument end of tachometer drive shaft.

Society of Automotive Engineers 1931 Handbook. Thermometer Bulbs; 1929. Dimensions of standard threaded thermometer bulb presumably for vapor pressure type thermometers for use with aircraft engines.

References.—Barometers and altimeters. *See* 917.2.

724.27 Parachutes and Equipment

Society of Automotive Engineers. Aeronautic Safety Code; 1925. Approved by American Standards Assn. as D1–1925. Parachutes. Permissible maximum landing speed, general requirements on attachment and disengagement of harness, requirements on airworthiness test, normal opening test, test for opening with suspension lines twisted, and strength test, routine tests and tests for deterioration.

724.29 Miscellaneous Aircraft Accessories and Parts

References.—Turnbuckles, aeronautic. *See* 608.7. Bolts and nuts, aeronautic. *See* 608.31, 608.32. Airplane cloth. *See* 396.

724.3 AIRPLANES

Society of Automotive Engineers. Aeronautic Safety Code; 1925. Approved by American Standards Assn. as D1–1925. For airplanes, requirements on stability characteristics, control arrangements, landing gear design, accommodations for pilot and passengers, materials according to recognized specifications, design features of wood and metal structural parts, fire prevention and protection, classification of airplanes, structural stress analysis of wing truss, fuselage, etc., power plant design features, assembly, and tests, equipment and operation of airplanes, signals and signal equipment, traffic and pilotage rules.

724.4 AIRSHIPS

Society of Automotive Engineers. Aeronautic Safety Code; 1925. Approved by American Standards Assn. as D1–1925. Airships. Requirements on safety factors in design of rigid airships and of fabric in nonrigid or semirigid airships, capacity of gas valves, bonding of metal parts, amount and discharge rate of ballast, fire prevention, recommended equipment, parachutes and life preservers, rules for inflation and deflation, operating and pilotage rules.

725. CYCLES, BOATS, SHIPS, AND ACCESSORIES

725.1 BICYCLES

References.—Bicycle tires. *See* 206.2.

725.2 MOTOR CYCLES AND ACCESSORIES

Society of Automotive Engineers 1931 Handbook. Recommended Practice; 1923. Magneto Mountings. Dimensions of magneto coupling and shaft end, dimensions of mountings, for motorcycles.

Society of Automotive Engineers 1931 Handbook. Motorcycle Head Lamp Mounting; 1921. Dimensions and thread of mounting bolt and dimensions of mounting lug.

Society of Automotive Engineers 1931 Handbook. Motorcycle Spokes; 1921. Dimensions and tolerances, material, bend and tension test requirements.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Motorcycle Wheels; 1918. Dimensions of hub and spoke angles for 28 by 3 inch clincher rim with 40 spokes.

Tire and Rim Assn. (Inc.). 1931 Year Book. Standard Rim Contours; 1929. For motorcycle rims, dimensions and tolerances for standard contours for drop center and for clincher motorcycle rims, gages for rims.

References.—Motorcycle tires. *See* 206.2, 206.4.

725.3 BOATS, RAFTS, AND PARTS

American Marine Standards Committee. H No. 26–1927. Standard Lifeboats. Double-ended open type. Specifications for block coefficient, form of bilge, mean shear, carrying capacity and certain dimensions.

Society of Automotive Engineers 1931 Handbook. Magneto Mountings; 1923. Dimensions of magneto coupling and shaft end, dimensions of mounting, for motorboats.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Marine Shaft-Ends; 1929. Dimensions of coupling nuts and washers, of taper, of keyways, cotter pins, and threads, up to three inch shaft size.

Society of Automotive Engineers 1931 Handbook. Motorboat Controls; 1920. Direction of motion of spark, throttle, and gear shift levers.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Motorboat Lighting Voltages; 1922. Recommended voltages for combined starting and lighting equipment and for larger cruisers having separate lighting equipment.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Propeller Hubs; 1929. Dimension of bores, keyways and hub lengths for shafts up to 3-inch size, for steel or other high strength material. Dimensions of coupling nuts, washers, and shaft ends.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Propeller Shaft Couplings; 1929. Dimensions of marine shaft couplings up to 3-inch shaft size, for steel or other high strength material.

Society of Automotive Engineers 1931 Handbook. Tachometer Drive for Marine Engines; 1931. Standard dimensions of tachometer end and of engine end of tachometer shaft, thread dimension.

U. S. Gov., Dept. of Commerce, Bureau of Navigation and Steamboat Inspection Service. Dept. Circular 236; 1928. Regulation of Motor Boats. For vessels propelled by machinery up to 65 feet length, except steam tug boats and tow boats. Mandatory requirements on number, color and location of running lights and sizes of lamp lenses, on provision of whistle, fog horn, life preservers, and fire extinguishing apparatus. Copy of law and regulations thereunder included.

U. S. Gov., Dept. of Commerce, Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Clark Life Rafts. For use on ocean vessels, mandatory requirements on tensile strength of material, thickness of metal, and construction of seams in cylinders, air space and deck area for each person, reversibility, and buoyancy.

U. S. Gov., Dept. of Commerce, Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Life Rafts of Catamarin Type. Mandatory requirements on tensile strength of material, thickness of metal, attachment of cylinders, construction, size, and pressure test of cylinders, reversibility of raft, passenger capacity.

U. S. Gov., Dept. of Commerce, Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Metallic Life Boats. Mandatory requirements on size and number of life lines, life preservers, oars and other equipment, on tensile test of metal, on material, sizes, and general construction of keels, stems, stern posts, etc., thickness and riveting of plates and attachment to stem, etc., material, thickness of plates, capacity, location, and testing of air tanks, passenger capacity of boat.

References.—Incandescent lamps for motorboats. *See* 716.12. Steel plates and structural steel for ships. *See also* 604.13, 605.15. Ships. *See* 725.4. Tolerances on metal fits. *See also* 615.82.

725.4 SHIPS

725.40 General Items

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. For steel ocean vessels, rules for construction and periodical inspection to be complied with in order that vessel receive and retain a Certificate of Class issued by A. B. S. Requirements on types of construction, sizes, thicknesses, spacings, riveting, etc., for keels, stems, stern frames, double bottoms, rudders, keelsons, frames, web frames, floors, beams, stringers, stanchions, girders, bulkheads, etc., construction, formulas for design, tests, and installation, for boilers, engines, pumps, piping, electrical equipment, and other machinery, types of materials required, their quality, testing, etc.

American Marine Standards Committee. Special No. 1–1928. Stability and Loading of Ships. Applies to new passenger vessels. Definitions, minimum initial stability when light and when operating, method of making inclining experiment.

U. S. Gov., Dept. of Commerce, Steamboat Inspection Service. Laws Governing the Steamboat Inspection Service; 1925. Includes mandatory requirements on inspection of vessels, boilers, machinery and appurtenances, on inspection and stamping of boiler plates, on plate thickness and spacing of flues, on hydrostatic test of boilers, on fire extinguishing equipment and pumps, on provision of life preservers, life boats, etc., on number of bulk heads, etc.

725.41 Ship Hull Details

American Marine Standards Committee. H No. 2–1925. Mooring Bitts, Cast-Iron. Dimensions of 12 standard sizes, standard arrangements of fastenings, material in conformity with Am. Bureau of Shipping specifications for gray cast iron.

American Marine Standards Committee. H No. 3–1925. Fixed Lights for Ships, Type A, Pressed Steel Frame. Dimensions of frame, sizes of glass and of bolt holes, for 3 standard sizes of lights.

American Marine Standards Committee. H No. 4–1925. Fixed Lights for Ships, Type B, Cast-Brass Frame. Dimensions of cast-brass frame, size of glass, spacing and sizes of screw holes, for 3 standard sizes of lights.

American Marine Standards Committee. H No. 5–1925. Fixed Lights for Ships, Type C, Cast-Brass Finished Frame. Dimensions of frame, size of glass, spacing and size of screw holes, for 3 standard sizes of lights.

American Marine Standards Committee. H No. 8–1926. Chain Plates. For cast-steel chain plates, dimensions of 12 standard sizes, working loads, material in accordance with requirements of Am. Bureau of Shipping for steel castings.

American Marine Standards Committee. H. No. 13–1926. Pad Eyes and Links. For cast steel pad and wrought steel link, dimensions of 15 standard sizes, working loads, materials according to requirements of Am. Bureau of Shipping.

American Marine Standards Committee. H. No. 14–1926. Railroad Iron Sling for Cargo Handling Gear for Ships. Dimensioned drawing of standard sling, to conform to Am. Bureau of Shipping specifications for chains.

American Marine Standards Committee. H. No. 15–1926. Chain Sling for Cargo Handling Gear for Ships. Dimensioned drawing of standard sling, to be in conformity with Am. Bureau of Shipping specifications for chains.

American Marine Standards Committee. H No. 17–1926. Mooring Bitts, Cast-Steel. Dimensions and methods of fastening for 12 standard sizes, material to be in accordance with Am. Bureau of Shipping specifications for grade 1 steel casting.

American Marine Standards Committee. H No. 20–1927. Pilot Ladder. Standard dimensions of hemp or manila rope ladder with wooden side pieces and steps.

American Marine Standards Committee. H No. 21–1927 to H No. 25, inclusive. Tubular Steel Cargo Booms for Ships. Capacities of 5, 10, 15, 20, and 30 tons. Dimensions of the standard sizes, general construction requirements, tension test requirements for the steel.

American Marine Standards Committee. H No. 27–1928. Scupper Valves. Standard dimensions of the 3, 4, 5, and 6 inch standard sizes.

American Marine Standards Committee. H No. 28–1928. Cargo Boom Fittings. Dimensions of standard bracket type boom steps for 5, 10, and 15 ton booms.

American Marine Standards Committee. H No. 29–1928. Cargo Boom Fittings. Dimensions of standard deck type boom steps for 15, 20, and 30 ton booms.

American Marine Standards Committee. H No. 30–1928. Heel Fittings for Tubular Steel Cargo Booms. Dimensions of standard heel fittings for 5, 10, 15, 20, and 30 ton booms.

American Marine Standards Committee. H No. 31–1929. Caps for Tubular Steel Cargo Booms. Dimensions of standard caps for 5, 10, 15, 20, and 30 ton booms.

American Marine Standards Committee. H. No. 35–1928. 4-inch Weather Deck Scupper. Material cast iron or cast steel, galvanized, dimensions of 1 standard size and type.

American Marine Standards Committee. H No. 36–1928. Deck Drain, Plain Type. For cast-iron or composition drains, dimensions of 4 standard sizes for steel decks and for covered decks.

American Marine Standards Committee. H No. 37–1928. Deck Drain, Trap Type. Cast-iron or composition drain, dimensions of 3 standard types of which one is for steel decks.

American Marine Standards Committee. H No. 38–1928. Deck Drain Strainers, Type A. Dimensions and design of 4 standard sizes of brass strainers.

American Marine Standards Committee. H No. 39–1928. Deck Drain Strainers, Type B. Dimensions and design of 4 standard sizes of brass strainer.

American Marine Standards Committee. H No. 40–1929. Lifeboat Disengaging Apparatus. General operating characteristics required, strength of parts, shop test requirements of tackle releasing devices, service test of apparatus under various specified conditions of loading and suspension.

American Marine Standards Committee. H No. 41–1929. Rat Proofing of Ships. Instructions for rendering rat proof the ceilings, sheathing, bulkheads, partitions, trunks, floors, doors, openings, pipes, ventilators, furniture, lockers, bins, etc.

American Marine Standards Committee. H No. 42–1929, Plain Open Chocks. H No. 43–1929, Plain Closed Chocks. H No. 44–1929, Open Chocks with One End Roller. H No. 45–1929. Closed Chocks with One End Roller. H No. 46–1929, Open Roller Chocks. H No. 47–1929, Closed Roller Chocks. H No. 48–1929, Open Chocks with Center Pillar and Plain Ends. H No. 49–1929, Open Chocks with Center Pillar, Plain and Roller Ends. H No. 50–1929, Open Chocks with Center Pillar and Roller Ends. Chocks or rope guides of cast iron or cast steel, material according to specifications of American Bureau of Shipping, or A. S. T. M., construction, dimensions, methods of fastening.

American Marine Standards Committee. H No. 51–1929 and H No. 52–1929. Mooring Pipes for Ships, Oval and Circular Types. For cast iron or cast steel mooring pipes, dimensions, design, pitch diameter of fastenings, size and number of rivets, and weight for 12 standard sizes.

American Marine Standards Committee. H No. 65–1931 to H No. 68–1931. Cleats for Ships. Standard design and dimensions of 3 to 5 sizes of 3 types of light cleats dependent on type of base and method of fastening, made of forged or cast steel or malleable iron, standard design and dimensions of 8 sizes of cast iron or cast steel heavy cleats, materials in accordance with specications of Am. Soc. for Testing Materials.

U. S. Gov., Dept. of Commerce, Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Steam Vessels. Mandatory requirements for vessels of each of above 4 classes as regards number and construction of life boats and life rafts, equipment and test of davits, number, materials, and construction of life preservers, number and location of bulkheads, fire extinguishing and fire detecting equipment.

References.—Ship inspection. *See also* 725.40. Rigging screws. *See* 608.7. Wire rope sockets and thimbles. *See* 603.42. Thimbles for manila rope. *See* 619.9. Fire hose racks for ships. *See* 974.3. Lifeboats. *See* 725.3. Medicine chests. *See* 915.43. Ship berths and supports. *See* 613.1. Door locks and accessories. *See* 617.21, 617.23, 617.31, 617.32. Ship bolt locks. *See* 617.61, 617.42. Sash hardware for ships. *See* 617.35, 617.43, 617.5. Cast iron, cast steel, cast brass. *See also* 611.11, 611.41, 645.21. Methods of testing and general requirements for metals. *See* 600.1. Zinc coatings. *See also* 600.3. Ship plates and structural steel. *See* 604.13, 605.15. Wire rope for ships. *See* 603.42, 647.38. Tolerances on metal fits. *See also* 615.82.

725.42 Ship Engineering Details

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Propellers. For solid propellers and built up propellers of cast iron, semisteel, cast steel, or bronze, requirements on hammer test, thickness of blades for standard design, formula for area of stud bolts, tensile and transverse test of cast iron and semisteel, tensile and bend tests for cast steel.

American Marine Standards Committee. E No. 3–1927. Couplings for Propeller Shafting. Flanged Couplings for Propeller Shafting. Dimensions of 78 standard sizes of flanges with their bolts and nuts, for line shaft sizes from 4½ to 18¼ inches, quality of material and workmanship to conform to requirements of Am. Bureau of Shipping.

American Marine Standards Committee. E No. 4–1927. Couplings for Propeller Shafts. Loose Couplings for Inboard Propeller Shafts. Standard dimensions of 56 sizes of flanges, their bolts, nuts and keys for line shaft sizes from 4½ to 18¼ inches, quality of materials and workmanship to conform to requirements of Am. Bureau of Shipping.

American Marine Standards Committee. E No. 5–1927. Tail Shafts and Stern Tube Bearings. Dimensions of 81 standard sizes of shafts, liners, and tube bushings for shaft sizes from 5 to 20 inches in diameter, quality of materials and workmanship to be in conformity with requirements of Am. Bureau of Shipping.

American Marine Standards Committee. E No. 6–1927. Propeller Keys. Standard dimensions of 16 sizes of keys and securing screws for tail shafts from 5 to 20 inches in diameter.

American Marine Standards Committee. E No. 7–1927. Propeller Nuts. Standard sizes and dimensions of nuts, for tail shafts from 5 to 20 inches in diameter.

American Marine Standards Committee. E No. 8–1927. Stern Tube Stuffing Boxes. For stuffing box with cast-iron gland for 2 types of shafts, dimensions of 81 standard sizes of stuffing boxes, number and sizes of stud bolts, for tail shaft sizes from 5 to 20 inches, quality of materials and workmanship in conformity with requirements of Am. Bureau of Shipping.

American Marine Standards Committee. E No. 9–1927. Hubs for Built-Up Propellers With Recessed Blades. For 3-bladed and for 4-bladed propellers, dimensions of 13 standard sizes of hubs for each type, for shaft sizes from 8 to 20 inches, quality of materials and workmanship to be in conformity with requirements of Am. Bureau of Shipping.

American Marine Standards Committee. E No. 10–1927. Fair-Water Caps for Built-Up Propellers with Recessed Blades. Dimensions and bolting requirements for 13 standard sizes of caps for jack shaft sizes from 8 to 20 inches, quality of materials and workmanship to be in conformity with requirements of Am. Bureau of Shipping.

American Marine Standards Committee. E No. 11–1927. Propeller Hub Studs, Nuts and Lock Screws. For collar studs, plain studs, nuts and lock screws, dimensions of standard sizes for sizes 1½ to 4½ inches, threading, workmanship and quality of materials in conformity with standards of Am. Bureau of Shipping.

American Marine Standards Committee. E No. 12–1927. Packing Gland for Propeller Hubs. Dimensions of 57 standard sizes of packing glands corresponding to tail shaft sizes from 8 to 20 inches, number of stud bolts, quality of materials and workmanship to be in conformity with requirements of Am. Bureau of Shipping.

American Marine Standards Committee. E No. 21–1928. Hubs for Built-Up Propellers, with Flush Facings. Dimensions of 13 standard sizes corresponding to tail shaft sizes from 8 to 20 inches, quality of materials and workmanship to be in conformity with requirements of Am. Bureau of Shipping.

American Marine Standards Committee. E No. 22–1928. Fair-Water Caps for Flush Faced Propeller Hubs. Dimensions of 13 standard sizes corresponding to tail shaft sizes from 8 to 20 inches, quality of materials and workmanship to be in conformity with requirements of Am. Bureau of Shipping.

American Marine Standards Committee. E No. 23–1928. Built-Up Propellers. List of component parts of built-up propellers, materials according to American Bureau of Shipping rules for building and classing steel vessels, general quality requirements for cast iron or cast steel hubs and cast steel or cast bronze blades, allowable materials for studs, nuts, lock screws, fair-water cap, packing gland, hammer test for blades, machining requirements for component parts of propeller, assembly and balance requirements.

American Marine Standards Committee. E No. 24–1928. Templates for Propeller Blade Flanges and Bolt Holes. Instructions for making templates, one for diameters and taper of blade flange and one for location of bolt holes, for cases where blades and hubs are purchased separately.

American Marine Standards Committee. E No. 25–1928. Propellers Cast in One Piece. Materials according to specifications of American Bureau of Shipping, general quality requirements for cast iron, semisteel, cast steel, and cast bronze propellers, hammer test and machining requirements, recommendations for degree of balance.

American Marine Standards Committee. E No. 28–1929 and E No. 29–1929. Sleeve Couplings for Ship Propeller Shafts. For solid couplings (E No. 28) and for split couplings (E No. 29), requirements on design and dimensions, keying and bolting for wrought steel solid coupling and cast steel split coupling, materials according to specifications of Am. Bur. of Shipping.

American Marine Standards Committee. E No. 30–1930. Fair-Water Caps for Propellers. For ships fitted with a contrapropeller or a streamline rudder, standard dimensions and design of fair-water caps for tail shaft sizes from 8 to 21 inches, using gray cast iron or other material conforming to specifications of Am. Bureau of Shipping.

Machinery Builders Society. Bronze Propellers; 1924. For complete propellers, cast in one piece or built up, and for propeller blades for installation on hubs, requirements on chemical composition of the manganese bronze, method of casting blades, tensile test requirements, machine work, permissible steel scrap in grey iron cast hubs.

National Fire Protection Assn. Regulations Governing Marine Fire Hazards; 1930. Requirement on installation and structural features of boiler lagging, boiler foundations, fire room floors, stacks, coal and oil bunkers, oil burning and heating systems, galley range, fire extinguishing equipment, electrical equipment, etc.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Steam Vessels. Mandatory requirements for vessels of each of above 4 classes as regards physical and chemical properties of boiler plate, design, test and construction of boilers, material and strength of piping, connections, valves, evaporators, feed water heaters, separators, and steam traps.

References.—Ship inspection. *See also* 725.40. Condenser tubes and tube ferrules. *See* 645.24, 645.22. Pressure and vacuum gauges for ships. *See* 793.2. Fire clay refractories for marine service. *See* 534.12. Pipe coverings. *See* 707.4. Metallic packing for condenser tubes. *See* 707.23. Marine boilers and pressure vessels. *See* 703.1. Boiler tubes. *See* 703.2. Marine boiler plates. *See* 604.11. Cast iron, cast steel, cast brass, cast bronze. *See also* 611.11, 611.41, 645.21, 646.41. Methods of testing and general requirements for metals. *See also* 600.1. Zinc coatings. *See also* 600.3. Marine steam engines and turbines. *See* 701.1, 701.2. Oil engines, gasoline engines, for ship propulsion. *See* 704.1, 705.7. Packing and gaskets for valves and pipe joints. *See* 707.1, 707.2. Electric generators for propulsion and for auxiliary service. *See* 711.11, 711.12. Electric motors for propulsion and for auxiliary service. *See* 711.21, 711.22. Storage batteries for auxiliary light and power. *See* 712.2. Controllers and starters. *See* 714.11. Switchboards. *See* 714.42. Circuit breakers, switches. *See* 714.51, 714.52. Conduit, feeder and junction boxes. *See* 715.11, 715.12. Receptacles and plugs. *See* 715.21. Electric cable and wire for marine use. *See* 715.41, 715.44. Searchlights. *See* 716.2. Watertight electric light fixture. *See* 716.32. Mechanical and electrical telegraphs on shipboard. *See* 718.39. Radio transmitters, radio receivers. *See* 718.63, 718.64. Radiocompass. *See* 718.66. Marine sextant. See 916.22. Tolerances for metal fits. *See also* 615.82.

725.43 Ship Operation Details and Supplies

American Marine Standards Committee. O No. 5–1925. Instructions for Care and Maintenance of Steel Hulls. Cleaning, types of coatings and periods of application to bottoms, decks, topsides, cargo space, bunkers, and tanks.

American Marine Standards Committee. O No. 12–1926. Essential Machinery Spare Parts, Accessories, and Supplies for Seagoing Ships. Lists of spare parts for steam engines, turbines, condensers, boilers, for reduction gears, for Diesel and gas engines, for feed, fire and other pumps, for heaters and distillers, for deck and refrigerating machinery, for deck and navigation outfits, for electrical generators, motors, batteries, switchboards, and cable and wire.

American Marine Standards Committee. O No. 13–1926. Equipment and Methods for Safety on Ships. Recommended equipment for safety in navigation, fire protection, personal welfare and safety, and emergency provisions.

References.—Marine glue for seams for ship decks. *See* 505.36. Hose for ships. *See* 202.0, 202.12, 202.22, 202.41, 202.42, 202.44, 202.46. Flexible metallic hose. *See* 607.7. Mattresses and mattress covers. *See* 315.10, 315.14. Bed sheets. *See* 315.2. Pillows and pillow cases. *See* 315.30, 315.31. Bedspreads, spring covers. *See* 315.4, 315.6. Table cloths, tray cloths. *See* 316.1, 316.4, 339.3. Towels, bath mats. *See* 319.3, 339.50. Marine uniforms. *See* 311.6, 368.82. Table glassware and chinaware. *See* 523.9, 532.1. Silverware. *See* 691.2. Wire rope for ships. *See* 603.42, 647.38. Oil burners for ships. *See* 703.9. Electric heaters for ships. *See* 717.1.

726. STEAM, ELECTRIC, AND GASOLINE RAILWAY CARS

726.0 GENERAL ITEMS

American Electric Railway Engr. Assn. Misc. Methods and Practices. E207–24; 1924. Protective Devices for Car Equipment. Recommendations on installation of choke coils, lightning arresters, circuit breakers, fuses, ground wire, and rating of circuit breakers, grounding practice.

American Electric Railway Engr. Assn. Misc. Methods and Practices. E208–26; 1926. Lubrication of Car Equipment. Inspection, kind of lubricant, amount of lubricant for slow speed and for high speed service, lubrication of motors, journals, air compressors, trolley bases and wheels.

American Railway Assn. Purchases and Stores Div. Standard Material Classification; 1922. Classification of the materials used by railroads under main numbered headings with detail lists of materials under each heading and the unit in which purchased.

References.—Devices for protection against lightning. *See* 715.5.

726.1 RAILROAD CARS

American Electric Railway Engineering Assn. E4–27; 1927. Dimensions for height of bumpers for interurban cars.

American Electric Railway Engr. Assn. Recommended specification. E101–27; 1927. Specification for the location of the end connection on interurban cars used in car exchange service. Dimensional drawing showing location.

American Mining Congress, under auspices of American Standards Assn. M 18–1928. Underground Transportation in Metal Mines. Includes haulage cars, type of bearings, side or end dumping, capacity, for both hand tramming and motor haulage.

American Railway Assn. Mechanical Div. Car Construction, Fundamentals and Details; 1929. Includes requirements on uniformity of section of car sills, recommended practice on framing for box cars, on design and strength of box car ends, standard splicing of steel and wooden sills.

American Railway Assn. Mechanical Div. Car Design, Fundamentals of; 1927. Standard dimensions of car, such as height from rail to various car parts, distance between center sills, inside dimensions of box cars, minimum draft capacity, ratio of unit stress to end load for draft attachments, etc.

American Railway Assn. Mechanical Div. Classification of Cars, Definitions and Designating Letters of; 1930. Standard class letters and definitions for freight equipment cars, recommended practice for passenger equipment cars.

American Railway Assn. Mechanical Div. Couplers, Height of; 1924. Standard maximum and minimum heights of draw bars for freight cars on standard gage railroads and on narrow gage railroads, standard height of coupler for passenger car equipment.

American Railway Assn. Mechanical Div. Tank Cars; 1926. For 6 types of tank cars classified according to strength, date of manufacture, and design features, requirements on bursting pressure. thickness of plates, riveting and sizes of rivets, dishing of heads, capacity and construction of dome, design of outlet valve, lagging, strength of center sills and draft attachments, anchorage to underframe, safety-valve equipment, hydrostatic test of tank, safety-valve test, materials and other equipment according to A. R. A. standards, specifications and recommended practices, requirements on construction and installation of hand brakes, running boards, handholds, railings, ladders, steps, safety valves, heater pipes.

American Railway Assn. Mechanical Div. Tank Cars; 1931. For transporting dangerous materials, explosives, etc., the specifications of the Interstate Commerce Commission effective Oct. 1, 1930, have been adopted and are published with additional A. R. A. details consistent with the I. C. C. requirements.

American Railway Assn. Mechanical Div. U. S. Safety Appliances for All Classes of Cars and Locomotives; 1928. For compliance with the safety appliance act, requirements on number, dimensions, location, and manner of application of hand brakes, running boards, steps, ladders, handholds, uncoupling levers, and safety railings, with dimensioned drawings.

American Railway Assn. Telegraph and Telephone Section. 1–A–21; 1927. Standard Outfit Cars for Construction Forces. Typical dimensions and layout of cars, equipment and hot water heating system for dining, sleeping, and tool cars.

Railway Fire Protection Assn. Handbook; 1925. Fire Cars for Terminal, Classification and Storage Yards. Recommendations on water capacity, pump duty, size and amount of hose and other fire fighting equipment.

Railway Fire Protection Assn. Handbook 1925. Rail Motor Cars. Gasoline Motor Type, Gas-Electric Type, and Oil-Electric Type. Recommendations on location of fuel tanks, filler openings, and hot water and hot air heaters, on fire protection of heaters, on total enclosure of motors, resistances, and make and break contacts, on incombustible material construction for oil-electric type.

U. S. Gov., Congress. Public, No. 113; 1893, amended 1896. An act to promote the safety of employees and travelers upon railroads by compelling common carriers engaged in interstate commerce to equip their cars with automatic couplers and continuous brakes and their locomotives with driving-wheel brakes, and for other purposes. Besides above, there are requirements for appliances on locomotives for operating the train brake system, provision of grab irons and handholds, and standard height of drawbars.

U. S. Gov., Congress. Public, No. 133; 1910. An Act to supplement " an act to promote the safety of employees and travelers upon railroads by compelling common carriers engaged in interstate commerce to equip their cars with automatic couplers, etc.," and other safety appliance acts, and for other purposes. Includes requirements for equipment of cars with sill steps, hand brakes, running boards, and ladders.

U. S. Gov., Dept. of Commerce, Bureau of Standards H5; 1923. Approved by American Standards Assn. as B 13–1924. American Logging and Sawmill Safety Code. For log railroad cars, requirements on provision of log bunks or safety chains, equipment with handholds, steps, and brakes, design features of brake wrench.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 103 and 103A. Riveted Steel Tanks to be Mounted on or to Form Part of a Car. For cylindrical tank with dished head, mandatory requirements on bursting strength, thickness and width of plates, riveting, calking, capacity of expansion dome, safety valve equipment, etc., pressure test, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 103B. Rubber Lined Riveted Steel Tanks to be Mounted on or to Form Part of a Car. For cylindrical tank with dished head, mandatory requirements on bursting strength, lining with acid resisting rubber, thickness and width of plates, riveting, calking, capacity of expansion dome, fixtures, etc., pressure test, dangerous articles for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 103C. Riveted Alloy Steel Tanks to be Mounted on or to Form Part of a Car. For cylindrical tanks, mandatory requirements on bursting strength, test of plates for resistance to acid, thickness and width of plates, riveting, calking, capacity of expansion dome, safety valve equipment, etc., pressure test, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 104 and 104A. Lagged Riveted Steel Tanks to be Mounted on or to Form Part of a Car. For cylindrical tank with dished heads, mandatory requirements on thermal efficiency of lagging, bursting strength of tank, thickness and width of plates, riveting, calking, capacity of expansion dome, outlets and safety valve equipment, etc., pressure test, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 105A300, 105A400, 105A500, and 105A600. Lagged Welded Steel Tanks to be Mounted on or to Form Part of a Car. For spherical tanks or cylindrical tanks with dished ends, mandatory requirements on thickness of plates, welding, manhole nozzle equipment, safety valve equipment, etc., thermal efficiency of lagging, pressure test of tanks at 300 pounds, 400 pounds, etc., dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 106A500 and 106A800. Welded Steel Tanks to be Mounted on or to Form Part of a Car. For cylindrical tanks with inwardly dished heads, mandatory requirements on tension and bend test of plate material, thickness of plates, construction of heads, welding and heat treatment, safety valve and other equipment, pressure test of tanks of 500-pound and 800-pound types, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 107A3350. Seamless Steel Tanks to be Mounted on or to Form Part of a Car. Mandatory requirements on hollow forged or drawn construction, attachment of ends, capacity, chemical composition, elongation, and bend test of steel, thickness of plates, heat treatment, safety valve and other equipment, pressure test of tank at 3,350 pounds, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for the Transportation by Rail of Dangerous Articles; 1930. Container Spec. 108. Lined, Coated, or Treated Wooden Stave Metal Hooped Tanks for Mounting on or to Form Part of a Car. For cylindrical, elliptical, or rectangular tanks with flat heads or covers, mandatory requirements on thickness of tank stock and hoops, construction of heads or covers, lining with rubber or coating with asphaltum or coal tar, or treating, pressure test, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 108A. Metal Jacketed, Coated, Wooden Stave Metal Hooped Tanks for Mounting on or to Form Part of a Car. For cylindrical tank inclosed in metal jacket, mandatory requirements on thickness of metal jacket and of tank material, lining with rubber or coating with asphaltum or coal tar, filling between tank and jacket, pressure test, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. United States Safety Appliance Standards; 1911. Order of The Commission. Mandatory requirements on number, location, dimensions, and manner of application of hand brakes, running boards, sill steps, ladders, handholds, and uncoupling levers, and standard height of drawbars, for all types of freight cars, passenger cars, and locomotives.

U. S. Gov., Post Office Dept. Construction of Mail Apartment Self Propelled Cars and Trailer Mail Apartment Cars Operated in Connection with Self Propelled Cars; 1929. Specifications cover the same main items listed under the more general specifications for the construction of steel full and apartment railway post office cars.

U. S. Gov., Post Office Dept. Construction of Steel Full and Apartment Railway Post Office Cars; 1929. Permissible types of construction as regards method of support of load, materials according to Am. Rwy. Assn. specifications, trucks according to Am. Rwy. Assn. specifications, buffing load requirement for design, general construction requirements for underframe, side frame, end, and roof, permissible stresses in members, material, thickness and construction of floors, doors, and windows, car insulation and heat conductivity of material, lighting equipment, location of lights, intensity of illumination, circuit arrangements, fuse and switch installations, location of fans, heating and installation of radiators, interior equipment, painting, drawings showing floor plans.

References.—Test weight cars. *See* 793.5. Protective devices, lubrication, classification of materials. *See* 726.0. Structural steel for cars. *See* 605.13. Alloy structural steel for cars. *See* 621.31, 621.32, 621.33. Iron and steel plates and sheets. *See also* 604.1, 604.2. Mine cars. *See* 751. Car lumber. *See* 413.2. Flooring for cars. *See* 411.29. Siding for cars. *See* 411.1. Roofing and lining for cars. *See* 411.7. Tank lumber. *See* 413.1. Parts and fittings for cars. *See* 726.2. Wiring of cars. *See* 715.30. Car lighting, car lighting equipment. *See* 716.30, 716.39. Electric locomotives. *See* 721.1.

726.2 PARTS AND FITTINGS FOR RAILROAD CARS

American Electric Railway Engr. Assn. Recommended Practice E110–26; 1926. Factors Affecting Foundation and Hand Brake Rigging Design. Terminology, design formulas for foundation brake rigging and parts, requirements on total leverage ratio, truck braking ratio, braking ratio, governor and safety valve adjustment.

American Electric Railway Engr. Assn. Recommended Specification E124–29; 1929. Trolley Poles, Wheels, Harps and Bases. For seamless cold-drawn steel trolley poles, recommended dimensions for 3 sizes each for light service and for heavy service, gauge of metal. For bronze trolley wheels, requirements on chemical composition and hardness, recommended design and dimensions for 3 sizes. For harp, general design and operating features required. For trolley bases, requirements on general design, provision of current shunts, permissible fiber stress in springs, permissible materials, dimensions, current carrying capacities.

American Electric Railway Engr. Assn. Misc. Methods and Practices E214–26; 1926. Proper Air Brake Installation. Kind of pipe and installation recommendations for various parts.

American Railway Assn. Grain Circular No. 1; 1920. Temporary Grain Doors and Grain Door Lumber. Specifications indorsed by Interstate Commerce Comm., requirements on dimensions of doors and of lumber, on construction and nailing for grain tightness.

American Railway Assn. Mechanical Div. Recommended Practice. Single Car Testing Device for Testing Air Brake Equipment; 1926. General design and application illustrated.

American Railway Assn. Mechanical Div. Recommended Practice. Stake Pockets for Flat Cars; 1928. Dimensions of 3 recommended standard types, 1 of wrought iron or rolled steel and 2 of malleable iron or cast steel.

American Railway Assn. Mechanical Div. Coupler Yokes; 1914. Standard dimensions of yoke for twin spring gear, tandem spring gear, and friction gear.

American Railway Assn. Mechanical Div. Front and Back Draft Stop; 1907. Dimensions of castings, spacing of bolt holes for standard stops.

American Railway Assn. Mechanical Div. Hopper Door Operating Shaft, End for; 1914. Standard dimensions of square end.

American Railway Assn. Mechanical Div. Doors for Box Cars; 1920. Minimum requirements on number, type, and dimensions of door fixtures for outside hung side door and for flush side door, fixtures of malleable iron, recommended practice for construction and reinforcing of outside hung box car doors.

American Railway Assn. Mechanical Div. Recommended Practice. Ice Tanks, Refrigerator Cars; 1911. Minimum capacities of ice tanks recommended for fresh meat cars and for fruit and dairy cars.

American Railway Assn. Mechanical Div. Brine Valve and Operating Riggings, Rules for; 1922. Requirements on minimum diameter of iron operating rod, lever, and pins, minimum thickness of malleable iron casting for valve and hand-hole covers, general operating requirements for valve, galvanizing, etc.

American Railway Assn. Mechanical Div. Safety Appliances for Cars and Locomotives. Various dates 1911 to 1916. For various types of freight and passenger cars and locomotives, requirements on provisions for hand brakes, number, dimensions and design of hand holds, hand rails, uncoupling levers, sill and side door steps, running boards, ladders, their location and application.

American Railway Assn. Mechanical Div. Hand Brakes; 1924. Load-test requirements for which hand brake equipment must be designed to meet.

American Railway Assn. Mechanical Div. Recommended Practice. Steam and Air Connections for Passenger Cars; 1930. Standard diameter for train line pipe, recommended diameters and lengths of air brake hose and air signal hose, and diameters of flexible metallic steam heat connections, recommended dimensions and design of steam and air hose couplings and clamps.

American Railway Assn. Mechanical Div. Air Brakes, General Arrangement and Details; 1930. Requirements on thickness of levers and pins, diameter of rods, diameter of holes for brake pins, size of brake chain, recommended size of brake cylinders and triple valves, diameter of brake pipes, etc.

American Railway Assn. Mechanical Div. Recommended Practice. Brake Levers, Rods, Connections and Pins for Passenger Equipment Cars Foundation Brake Gear; 1928. Design requirements such as required braking force, pressures in brake cylinder, stresses in levers, rods, and pins, bearing value of pins, brake leverage ratio.

American Railway Assn. Mechanical Div. Recommended Practice. Bottom Rod Support. Brake Beam Hangers and Attachments; 1926. Standard dimensions and design.

American Railway Assn. Mechanical Div. Recommended Practice. Hatch Plugs for Refrigerator Cars; 1927. Requirements on dimensions, construction and design of wooden hatch plugs.

American Railway Assn. Mechanical Div. Draft Gear Followers; 1907. Thickness requirements for flat followers of wrought iron or steel for tandem spring gear and for twin spring and friction draft gear.

References.—Classification of railway materials. *See* 726.0. Cast iron wheels. *See* 611.18. Journal boxes, journal bearings. *See* 611.22, 692.3. Brake beams, brake shoes. *See* 611.42, 611.43. Couplers, axles. *See* 611.44, 611.52. Steel wheels and tires, cast and wrought. *See* 611.49, 611.53. Springs, gears and pinions. *See* 611.54, 611.55. Center plates, coupler yokes, pedestals, truck bolsters and side frames, center sills, and other structural steel for cars. *See* 605.13. Wiring of cars, car lighting, lighting equipment. *See* 715.30, 716.30, 716.39. Lamps for train lighting. *See* 716.10. Railway motors. *See* 711.3. Axle generator and regulator. *See* 711.12, 714.11. Trolley current collectors. *See* 719.63. Railway control apparatus. *See* 714.11. Motor rating basis, standard voltages, methods of testing, safety codes for electrical equipment. *See also* 710. Train line receptacles and connectors. *See* 715.21. Battery charging receptacle and plug. *See* 715.21. Protective devices for electrical equipment. *See* 726.0, 715.5. Safety valves for tank cars. *See* 607.6. Triple valves and tests. *See* 607.6. Air brake and signal hose. *See* 202.11. Steam hose, tender tank hose. *See* 202.44, 202.45. Flexible metallic hose. *See* 607.7. Parts and fittings for electric locomotives. *See also* references under 721.1. Draft Gear Followers. *See* 611.59. Car stock lumber. *See* 413.2.

727. CARRIAGES, BUGGIES, COACHES, BABY CARRIAGES AND CARTS

729. MISCELLANEOUS VEHICLES AND VEHICLE PARTS

729.1 WHEELBARROWS

U. S. Gov., Dept. of Commerce, Bureau of Standards. R105–29; 1929. Wheelbarrows. Simplified practice recommended and accepted by industry covering the rating of all steel-tray barrows according to the cubical contents of the struck capacity and the limitation of stock sizes and types to the ones listed in the publication, thickness of metal for each type.

729.2 TRAILERS

729.3 TRUCKS

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Hand Trucks. For 850-pound sausage meat truck. Requirements on truck dimensions, sheet thickness of sheet steel body, general construction and galvanizing, dimensions of malleable iron wheels, and caster, dimensions of steel axle.

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Hand Trucks. For general purpose trucks, requirements on dimensions, sheet gage of steel body, general construction, galvanizing, dimensions of steel shaft and of steel or wood wheels.

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Hand Trucks. For hide truck, made of maple with oak frame, requirements on dimensions of truck, of steel wheels, cast iron hub, and steel axle, thickness of wood in body and frame.

Institute of American Meat Packers. Packinghouse Supplies, Packs. and Equipment; 1928. Hand Trucks. For steel ham and bacon trucks, requirements on dimensions of truck, malleable iron wheels, and steel axle, thickness of steel, general construction.

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Hand Trucks. For tank charging truck, requirements on over-all dimensions and body dimensions, on gage of steel and general construction, galvanizing, dimensions of steel axle, of steel or wood wheels.

References.—Automobile motor trucks. *See* 722.1. Electric trucks. *See* 721.2. Steel sheets. *See* 604.22, 604.23, 604.25. Axles and steel forgings. *See* 611.52. 611.51. Cast iron, malleable cast iron, cast steel. *See* 611.11, 611.21, 611.41. Sizes of wheels and tires for industrial (inside of plant) trucks. *See* 206.5.

729.4 WAGONS, WAGON PARTS, AND MATERIALS

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Office of Sec. Circular 72; 1917. Width of Wagon Tires Recommended for Loads of Varying Magnitudes on Earth and Gravel Roads. As result of traction tests, 5 standard ttire widths are recommended for 5 wagon sizes of gross weight with load of 2,000 to 7,500 pounds, inclusive.

References.—Lumber stock for wagons. *See* 413.54.

729.5 TRACTORS AND TRACTOR PARTS

American Society of Agricultural Engineers. Power Take-Off for Agricultural Tractors and Machines; 1931. Standard sizes, dimensions, and design of spline shafts and hubs for power take-off, normal speed and direction of rotation of shaft, recommended practice on location and layout of power take-off shaft and appurtenances on tractor and on driven machine.

American Society of Agricultural Engineers. Tractor Testing and Rating Code; 1925. Definitions of belt horsepower rating and drawbar rating in terms of maximum developed horsepowers, test procedure for maximum brake horsepower, rated brake horsepower, and maximum drawbar horsepower tests.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Brakes, Industrial Truck and Tractor. Brakes to be released by depressing the brake pedal and applied by removing the foot.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Clearance Radii, Industrial Truck and Tractor; 1920. Definition of outside and of inside clearance radius.

Society of Automotive Engineers 1931 Handbook. Magneto Mountings; 1923. Dimensions of magneto coupling and shaft end, dimensions of magneto mounting, for tractors.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Rims, Cleats and Lugs for Tractor Wheels; 1919. Face width and rim thickness for rims for plain flat plate rims and flanged rims for front wheels, and rim thickness for rear wheels.

Society of Automotive Engineers 1931 Handbook. Tractor Belts and Pulleys, Belt Speeds; 1926. Three speeds specified.

Society of Automotive Engineers 1931 Handbook. Tractor Belts and Pulleys, Clutch Diameters; 1918. Minimum diameter of 12 inches.

Society of Automotive Engineers 1931 Handbook. Tractor Belts and Pulleys, Driving Pulleys; 1921. Minimum diameter and widths.

Society of Automotive Engineers 1931 Handbook. Tractor Drawbar Adjustments; 1922. Hitching positions from furrow wall for 2-bottom, 3-bottom, and 4-bottom plows.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Tractor Flywheel and Clutch Housings; 1926. Dimensions and cap screw sizes for two sizes of housings.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Tractor Power Take-Off Speed; 1929. Spline fitting required and dimensions, speed, direction of rotation, and diameter of splined power take-off shaft.

Society of Automotive Engineers 1931 Handbook. Tractor Rating Code; 1926. Definition of belt rating and of drawbar rating and method of test to determine these ratings, typical test log sheets.

Society of Automotive Engineers 1931 Handbook. Tractor Speeds; 1924. Gives standard speed for plowing and for hauling in industrial plants.

References.—Canvas and rubber driving belts. *See* 314.1, 207.3. Shafts and forgings. *See also* 611.52, 611.51. Automobile and truck accessories and parts. *See also* 722.3.

729.6 SLEDS AND SLEIGHS

Amateur Athletic Union of the U. S. Official Athletic Rules. 1931. Publ. No. 117R of American Sports Publishing Co., 45 Rose St., New York, N. Y. Bob-Sleighs. Two sizes for 2 member crew and for 4 member crew, requirements on maximum length and weight, standard widths between runners, required type and width of brakes.

730–739 AGRICULTURAL MACHINERY AND IMPLEMENTS

731. MILK, CREAM, AND CHEESE MACHINERY

International Assn. of Milk Dealers. Blueprint No. 2; 1923. Standard Sanitary Fitting. Dimensions and thread for standard union type fitting for tubes from 1-inch to 5-inch outside diameter.

International Assn. of Milk Dealers. Drawings No. 1186, 1187, 1188, 1190, 1237, 1238, 1239, 1242, 1243, 1246. Dated 1929. Sanitary Pipe Union with Paper Gasket. Drawings showing dimensions, threading, and assembly of union parts and gasket for 1½, 2, 2½, and 3-inch unions made of bronze.

International Assn. of Milk Dealers. Sketch 4667–D; 1926. Standard Sanitary Thermometer Connection for Vats. Detail dimensions and thread requirements for spud fitting.

International Assn. of Milk Dealers. Sketch 4667–E; 1926. Standard Thermometer Connection for Glass Lined Tanks. Detail dimensions and threading.

U. S. Gov., Treasury Dept. U. S. Public Health Service. Reprint No. 1154; 1927. Definitions of Pasteurization and Their Enforcement. Includes recommended tentative specifications for pasteurization apparatus, for vat type apparatus, pocket type apparatus, and continuous flow type apparatus. Requirements on prevention of cold pockets, provision of leak escape valves, thermometers, and heat above milk.

References.—Cream and butterfat test scales. *See* 793.5.

732. PLANTERS, PLOWS, CULTIVATORS, HOES, RAKES, AND MOWERS

National Assn. of Farm Equipment Manufacturers. Book of Standards; 1926. List of sizes chosen as standard for steel walking plows, riding and wheel walking plows, disk plows, chilled plows, corn planters, corn and cotton riding drill planters, stalk cutters, peg-tooth harrows, disk harrows, spring-tooth harrows, walking and riding cultivators, beet implements, solid and wing sweeps of plows, corn shovels, straight shovels, etc.

American Society of Agricultural Engineers. Disk Blades for Disk Plows, Harrows, Drills, Listers and Cultivators; 1931. Standard dimensions, bevel and concavity of disks, and recommended gages for a limited number of standard sizes of disks for disk harrows, vertical and standard disk plows, grain drills, etc.

733. FERTILIZER DISTRIBUTORS AND SPRAYING MACHINES

References.—Power take off for tractors and agricultural machinery. *See* 729.5.

734. HARVESTING MACHINERY, THRESHERS, AND POTATO DIGGERS

References.—Power take off for tractors and agricultural machinery. *See* 729.5

735. ENSILAGE CUTTERS AND FEED GRINDERS

References.—Power take off for tractors and agricultural machinery. *See* 729.5

736. TRACTORS

References.—Tractors. *See* 729.5.

740–749 CONSTRUCTION, CONVEYING, AND HOISTING MACHINERY

740. GENERAL ITEMS

National Sand and Gravel Assn. (Inc.). Report of Committee on Standard Depreciation Scale; 1926. For sand and gravel excavation equipment, including cars and locomotives, years of economical life for each piece.

741. EXCAVATING AND DREDGING MACHINERY

References.—Mining machinery and mining equipment. *See* 751.

741.1 PILE DRIVERS

741.2 BORING MACHINES

References.—Diamond core drill fittings. *See* 741.3.

741.3 DRILLING MACHINES

U. S. Gov., Dept. of Commerce, Bureau of Standards CS17–30; 1930. Diamond Core Drill Fittings. A commercial standard selected and accepted by industry covering 4 sizes of fittings, dimensions of rod couplings and casing couplings, dimensions of threads of rod couplings, drill rods, core barrel bits, casing, casing coupling, and casing bit.

References.—Oil well machinery. *See* 754.

741.4 POWER SHOVELS

741.5 DREDGING MACHINERY

References.—Dredging sleeves. *See* 209.1.

742. CONCRETE MIXERS

Associated General Contractors of America Concrete Mixer Standards; 1931. Includes construction mixer and paving mixer. Rating and standard sizes, requirements for standard size water measuring tanks, water connections, kinds of tools and accessories and number required, mounting and traction speed for paving mixers, standard reach for paver boom and bucket attachments and for batch-box derricks.

References.—Donkey engines. *See* 703.1. Automobile truck engines, tractors. *Sec* 722.31, 729.5.

743. ROAD-MAKING EQUIPMENT

American Assn. of State Highway Officials. State Highway Standard Cutting Edge Punchings; 1929. For grading machines, drawing showing standard dimensions of replaceable cutting edge with size and spacing of bolt holes.

American Road Builders' Assn. Convention Proceedings; 1931. Steel Side Forms for Concrete Pavements, Standardization of. Recommendations on standard widths of base for various heights of form, permissible vertical tolerance on the top and lateral tolerance on the upstanding leg.

References.—Concrete mixers, tractors, plows. *See* 742, 729.5, 732. Weighing equipment for concrete aggregates. *See* 793.5.

744. CRANES, HOISTS, AND JACKS

744.1 CRANES

Assn. of Iron and Steel Electrical Engineers. Recommended Rules for the Safe Operation of Electric Overhead Traveling Cranes; 1926. Rules for crane operators and rules for floor men.

Assn. of Iron and Steel Electrical Engineers. Electric Overhead Traveling Cranes, Heavy Duty Steel Mill Service; 1921. Includes hot metal cranes and general mill service cranes, requirements for safety factor of crane parts, stress in castings, standard dimensions of shafting, track wheels and rails, capacity of brakes, general construction of bridge girder, trolley, cab, railings, gears, and accessories.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn. C1–1931. Cranes. Insulation and minimum sizes of wire, clearance and spacing of exposed wire and collector wire, switch and cutout requirements, mounting of controller resistances, grounding.

U. S. Gov., Dept. of Commerce, Bureau of Standards. H7; 1926. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the Installation and Maintenance of Electric Utilization Equipment. For electric cranes, requirements on guarding live and moving parts, guarding or isolating of collector wires, grounding, types of power disconnecting means, provision of locking or removable operating handles, provision of limit switches and reverse-phase relays.

References.—Cast iron, malleable cast iron, cast steel. *See also* 611.11, 611.21, 611.41. Structural steel. *See also* 605.1. Electric motors, electric controllers. *See* 711.2, 711.3, 714.11. Methods of testing motors. *See* 710, 711.20. Electric wire. *See* 715.44. Tolerances for metal fits. *See also* 615.82.

744.2 HOISTS

Electric Hoist Manufacturers Assn. Portable Overhead Hoists; 1925. Using motors of intermittent duty rating, permissible temperature rise of motors and of controller resistors, requirements on inclosure of controllers, materials and cutting of gears, speed limiting and load holding capacity of brakes, size and reeling capacity of cast iron drums, construction of plow steel hoist rope, provision of limit switch, etc.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn. C1–1931. Hoists. Insulation and minimum sizes of wire, clearance and spacing for exposed wire, switch and cutout requirements, mounting of controller resistances, grounding.

U. S. Gov., Dept. of Commerce, Bureau of Standards. H7; 1926. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the Installation and Maintenance of Electric Utilization Equipment. For electric hoists, requirements on guarding live and moving parts, guarding or isolating of collector wires, grounding, types of disconnecting means, provision of locking or removable operating handles, provision of limit switches and reverse-phase relays, etc.

References.—Mine hoists. *See* 751. Elevators. *See* 745.3. Steel wire rope. *See also* 603.42. Cast iron, malleable iron, cast steel. *See* 611.11, 611.21, 611.41. Electric motors and controllers. *See olso* 711.2, 711.3, 714.11. Methods of test, protection, safety codes for motors. *See also* 710, 711.20. Electric wire. *See* 715.44.

744.3 JACKS

References.—Screw jacks and hydraulic jacks. *See* 616.91.

745. ELEVATORS AND CONVEYORS

745.1 CONVEYORS

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Trolleys. Requirements on dimensions of one standard size of single wheel trolley with cast iron wheel and steel housing for transportation of meats on overhead track.

745.2 DUMB-WAITERS

745.3 ELEVATORS

American Society of Mechanical Engineers, joint sponsor with the Bureau of Standards and American Institute of Architects under procedure of American Standards Assn. A 17–1931. A Safety Code for Elevators. Covers construction, inspection, maintenance, and operation of elevators, dumbwaiters, escalators and their hoistways excepting belt, bucket, or roller conveyors for freight, piling machines, skip hoists, wharf ramps, amusement devices, elevators of over 30,000 pounds capacity and elevators used during building construction. Requirements as to hoistway construction, guards and landings, elevator requirements as to guides, buffers, counter-weights, car construction, safeties for car and hoisting machinery, cables and signal systems, rules for inspection, maintenance and operation.

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn. C1–1931. Elevators. Permissible voltages on various parts, types, insulation, minimum sizes, protection, installation of conductors for various circuits, requirements on enclosure of live parts, grounding, clearance around controller panels, location of disconnecting switch, elevator machine and controller.

National Board of Fire Underwriters. Recommended Building Code; 1922. Construction and Operation of Elevators. Construction of incombustible materials, provision of trap door and safety devices, construction requirements for shaft, counterweights, number of door openings in shaft, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards. H7; 1926. Approved by American Standards Assn. as part of C 2–1927 (National Electrical Safety Code). Safety Rules for the Installation and Maintenance of Electric Utilization Equipment. For electric elevators, requirements on guarding live and moving parts, provision of locking or removable operating handles, location of controller lever, provision of limit switches and of reverse-phase relays.

References.—Industrial hoists, mine hoists. *See* 744.2, 751. Steel cables. *See also* 603.42. Electric motors, controllers. *See also* 711.2, 711.3, 714.11. Methods of test, protection, safety code for motors *See also* 710, 711.20. Electric wire. *See* 715.44.

750–759 MINING, OIL WELL, AND PUMPING MACHINERY

750. GENERAL ITEMS

American Institute of Mining and Metallurgical Engineers; 1928. Proposed Safety Code for Coal Mine Ventilation. Definitions, provision of a ventilation map, specifications of intakes and returns, requirements on overcasts, stopings, doors and brattices, provisions against contamination of air, safety lamps, installation and use of fans.

American Institute of Mining and Metallurgical Engineers. Adopted by American Standards Assn. as M 13–1925. Recommended Practice for Rock Dusting Coal Mines to Prevent Coal Dust Explosions. Kind, size, and amounts of dust to be used, parts of mine to be dusted, sampling of dust after mine has been dusted, for all bituminous mines.

American Mining Congress. Approved by American Standards Assn. as M15–1931. Safety Code for Coal Mine Transportation. Requirements on bonding of tracks, clearances along track, installation and operation of stopblocks and derails, signal systems, slope and shaft hoists, permissible types of haulage, location of trolley wires, operation of man trips, hauling explosives, inspection rules.

U. S. Gov., Dept. of Commerce. Bureau of Mines. Bull. 277; 1928. Safety in Coal Mining. Practices and methods recommended by the bureau for increase of safety in coal mining, covering prevention of explosions by ventilation design, rock dusting, use of permissible explosives, permissible safety lamps and lighting, proper use of electrical machinery, prevention of falls of ground, haulage accidents, mine fires and fire equipment.

751. MINING AND QUARRYING MACHINERY

American Mining Congress, sponsor under auspices of American Standards Assn. M 6–1931. Drainage of Coal Mines. Requirements for pumps and pumping stations, specifications for electric driven plunger pumps, for centrifugal pumps, for pump accessories, construction of sumps, practice in priming piston, plunger and centrifugal pumps, semiremote control, safety precautions and attendance, natural drainage, unwatering abandoned workings, mine water and its action upon mine drainage equipment, recommendations of metals and alloys to use.

American Mining Congress. American Standards Assn. M 10–1928. Miscellaneous Outside Coal Handling Equipment. Hoisting signals, safety requirements for man haulage equipment, safety methods around tipple, fire protection, dimensions of shafting, bearings, pedestals and motor shafts at pulley end.

American Mining Congress, sponsor. Approved by American Standards Assn. as M 12–1928. Construction and Maintenance of Ladders and Stairs for Mines. Requirements on construction and protection of mine ladderways, required use and minimum dimensions of stairways and ladders, ladders in conformity with Safety Code for Ladders, A 14–1923 of Am. Standards Assn.

American Mining Congress, under auspices of American Standards Assn. M 18–1928. Underground Transportation in Metal Mines. Standard type of car, track gage, rail weight, grade of track, and dimensions of drift for hand tramming and motor haulage, weight of locomotive for motor haulage.

American Mining Congress under auspices of American Standards Assn. M 19–1928. Mechanical Loading Underground in Metal Mines. Mechanical shovelers; classification, working conditions, repairs, personnel; recommended requirements on design and size of scrapers, hoists, wire rope, sheaves, lights, and slides.

American Mining Congress. Mine Locomotives. (Coal Mines); 1928. Does not include combinations of trolley and storage battery types. Standard d. c. voltage ratings and weights for trolley type and storage battery type locomotives, drawbar pull, locomotive and motor rating methods.

National Crushed Stone Assn. Drilling Equipment; 1926. Drill tool joint standards of American Petroleum Institute adopted. Four sizes of holes for use in quarry work selected as standard. *See* 754.

U. S. Gov., Dept. of Commerce. Bureau of Mines. Schedule 2C; 1930. Explosion Proof Mine Equipment. Longwall Mining Machines. Requirements for approval for use in gassy and dusty mines, including provision of switch for opening all power circuits with fuse or automatic circuit interrupter for each power conductor, or the use of a junction box containing these devices.

U. S. Gov., Dept. of Commerce, Bureau of Mines. Schedule 12A; 1930. Single Shot Blasting Units, Requirements for Permissibility. For battery type units, requirements on inclosure and locking of battery casing, plug and receptacle operation, drop test, shelf depreciation test, design to prevent ignition of explosive mixture. For magneto type, requirements on locked casing, automatic disconnect of drive, repeated service tests, maximum current and pressure rating permitted, drop test, etc. How approval is granted.

U. S. Gov., Dept. of Commerce, Bureau of Mines. Schedule 16; 1920. Procedure for Establishing a List of Permissible Multiple-Shot Blasting Machines. For use in nongaseous mines and quarries, requirements on operation in presence of moisture and dust, on operation at end of plunger stroke, rating test and life test, scope of approval, fees.

References.—Blowers, compressors. *See* 791.1, 791.2. Track rails, frogs, switches. *See also* 606.1, 606.3. Pumps. *See also* 755.1. Electric motors, controllers for dangerous mines. *See* 711.25, 714.11. Other electric motors. *See* 711.2. Safety code for electric equipment in mines. *See* 710. Oxygen breathing apparatus. *See* 993. Safety code for mines. *See* 750. Miners lamps and gas detectors. *See* 997.6 and 716.17. Safety code for wooden ladders. *See* 429.4. Wire ropes. *See also* 603.42. Electric wire. *See* 715.44. Explosion proof storage batteries and battery boxes. *See also* 712.2, 712.3. Trolley and track material. *See also* 719.63. Fire fighting equipment. *See* 970. Tolerances for metal fits. *See also* 615.82.

752. ORE CRUSHING AND ORE SORTING MACHINERY

753. SMELTING AND ROASTING MACHINERY

754. OIL WELL MACHINERY

American Petroleum Institute. Standard No. 3; 1930. Dimensional Standards for Cable Drilling Tools. Standard dimensions of cable drilling tool joints and tool joint gages, tolerances on gages, thread form, standard dimensions of rope socket necks, diameters of jars over reins and standard length of stroke, check testing of reference gages, recommended thread turning practice.

American Petroleum Institute. Poster No. 4; 1928. Recommended Practice. Standard Groove Form for Wire Rope and Manila Cordage. Dimensional specifications and design formulas.

American Petroleum Institute. Standard No. 4; 1931. Standard Rigs and Derricks. Standard major dimensions of steel, and of wood derricks, including heights, bases, and water table openings, dimensions of sampson posts, walking beams, bull wheels, calf wheels, and band wheels, requirements on dead and wind load capacities of derricks and working capacities of sampson posts and walking beams.

American Petroleum Institute. Standard No. 6; 1930. Rig Iron Standards. For 3 standard sizes, requirements on dimensions for cranks and shafts, wrist pins, band wheel flanges, band wheel flange keys, shaft set collars, jack post boxes, gudgeons, pitman stirrups, crown sheaves, sand line sheaves, casing line sheaves, sand reels; and for the 6-inch size, dimensions of calf wheel rim, clutch sprocket and strap, and clutch.

American Petroleum Institute. Standard No. 7–A; 1931. Miscelleanous Rotary Standards. Recommended Practice on Methods of Measurements, Etc. Method of measurement of sheaves and hoisting blocks and drilling hooks, standard taper for spider or master bushing in rotary drilling machine, threads for extra bowls on over shots.

American Petroleum Institute. Standard No. 7–B; 1931. Rotary Drilling Taper Joints. Basic thread form, requirements on pitch and taper of joint and essential dimensions for rotary tool joints, fishtail bits, drill collars, rotary driving stem and couplings, swivel gooseneck connections, alignment test for tool joints, specifications and tolerances for master tool joint gages.

American Petroleum Institute. Standard No. 11–A and Supplement No. 1; 1931. Oil Well Pumps. Standard dimensions and tolerances for 4 standard sizes of cold drawn and of machined liner working barrels, of plungers, valves, couplings, etc., dimensions of measuring gages for the various parts and tentative standard dimensions for inserted cast iron liner and cold drawn barrel pumps.

American Petroleum Institute. Standard No. 11B 1931. Sucker Rods for Pumping Purposes. Requirements on sucker rod dimensions, threads and contact dimensions, for 3 standard sizes, specifications for master gages, gaging practice.

American Petroleum Institute. Standard No. 11–D; 1930. Miscellaneous Pumping Equipment Standards. Standard dimensions for polished rods, pull rods, counter shafts for belted pumping units, reduction gear pumping units, well head taps and fittings, rotary counterbalances, and screen pipe openings.

References.—Oil field boilers. *See* 703.0, 703.1. Internal combustion engines. *See* 705.3. Roller or sprocket chain. *See* 766.1. Leather belting. *See* 066.3. Rubber belting, balata belting. *See* 207.3. Cotton belting, hair belting. *See* 314.1. Manila cordage, wire rope. *See* 331.16, 603.42. Tanks. *See* 605.23. Line pipe, drill pipe, casing and tubing. *See also* 607.3, 607.4. Line shafts for rotary drilling. *See* 611.52. Diamond core drill fittings. *See* 741.3. Induction motors. *See* 711.21. Tolerances on metal fits. *See also* 615.82.

755. PUMPS, POWER-DRIVEN AND HAND PUMPS

755.0 GENERAL ITEMS

American Society of Mechanical Engineers. Power Test Code. Centrifugal and Rotary Pumps; 1927. Applies to tests for determining the performance of pump only and not to piping or driving apparatus or auxiliaries. Methods of measurement of quantity of water delivered and of speed, methods and illustrations of gages with their formulas for measuring dynamic head, measurement of power input, calculation of efficiency, forms for tabulating test data and calculations.

American Society of Mechanical Engineers. Power Test Code. Reciprocating Steam-Driven Displacement Pumps; 1925. Applies to tests for performance of pump and engine, including heaters, jacket pumps, circulating, condensate or vacuum pumps which are concerned in their operation. Required measurements, preparatory tests, starting and stopping instruction, calculations, forms for tabulation of data and calculations for efficiency and duty.

American Society of Mechanical Engineers. American Assn. for Advancement of Science. American Institute of Electrical Engineers. American Society of Civil Engineers. Society for Promotion of Engineering Education. Approved by American Standards Assn. as Z 10b–1929. Symbols for Hydraulics. Hydraulic engineering symbols including standard symbols used in design of water turbines and pumps.

Hydraulic Society. Standards; 1931. Definitions of efficiency, head, horsepower, viscosity applicable to hydraulic machinery. Classification of pumps, types and parts of pumps defined and illustrated for steam driven reciprocating displacement pumps, rotary displacement and centrifugal pumps, for deep well pumps, installation and operation.

755.1 PUMPS, POWER DRIVEN

American Mining Congress. Mine Drainage. Approved by American Standards Assn., M6–1927. Centrifugal Pumps. For horizontal type with split casing, requirements on general design, provision of vent cocks and wearing rings, acid resisting metal for impellers and shaft, requirements on size, general design and material of stuffing boxes and bearings, protective shield for motor.

American Mining Congress. Mine Drainage. Approved by American Standards Assn., M6–1927. Electric Driven Plunger Pumps. For outside packed type, requirements on sectionalized design, cast iron or acid resisting metals for cylinders, bronze bushings for stuffing boxes, provision of drains and vents, plungers and glands of acid resisting materials where used with acidulous water, relief valve and fittings to be furnished.

Associated Factory Mutual Fire Insurance Companies. Centrifugal Fire Pumps; 1931. Requirements on discharge pressures, standard capacities and speeds, minimum efficiencies, characteristic curves, strength tests of casing and bolting, material and design of casing, water passages, impellers, bed plate, shaft, bearings, stuffing boxes, valve fittings and piping connections, installation, acceptance tests. For electric drive, requirements on power supply, specifications for motor and controller, installation rules. For steam turbine drive, requirements on steam consumption, speed, general specifications, and installation of turbine. For gasoline engine drive, requirements on power and speed, general specifications, and installation of engine.

Associated Factory Mutual Fire Insurance Companies, National Board of Fire Underwriters. Steam Fire Pumps; 1926. Duplex type, standard sizes, capacities and speeds, strength of parts, design and construction requirements for cylinders, yokes, bolts, ports, clearance, pistons, valves, cushion valves, rock shafts, etc., for both steam and water end, test requirements for internal friction, strength, tightness, safety features, slip, and operation at maximum pressure and capacity, installation requirements, suction pipe sizes.

Associated Factory Mutual Fire Insurance Companies. Steam Pump Governors and Auxiliary Pumps; 1929. Requirements on construction and operating characteristics for automatic governor and recommendations as to size and type of auxiliary pump for a fire protection system, installation rules, recommended governor sizes.

Associated General Contractors of America. Contractors Pump Standards; 1931. For 2 standard sizes of road pumps, rated discharge, pressure, and engine speeds, minimum sizes of intake and discharge openings, minimum piston displacement of engine; for 3 standard sizes of open type suction diaphragm pumps, capacity and lift ratings, minimum power of engine, size of intake.

National Board of Fire Underwriters. Centrifugal Fire Pumps; 1929. Single stage, horizontal or vertical type, standard capacities and speeds, required efficiency and characteristics, sizes of passages and outlets, rules for installation. Electrical driven pumps, sources of power, size of line, speed regulation and heating test requirements for motor, controller equipment requirements, inclosures and installation requirements. For steam turbine driven pumps, capacity, speed, construction, and installation requirements of turbine. For gasoline engine driven pumps, type, starting equipment, power, speed, accessory, and installation requirements for engine, requirements for gasoline supply and tanks. Acceptance test requirements, rules for operating.

References.—Gasoline filling station pumps. *See* 793.6. Automobile truck fire pumps. *See* 722.2. Methods of test, definitions, classification. *See also* 755.0. Oil well pumps. *See* 754. Cast iron. *See* 611.11. Shafts and steel forgings. *See* 611.52, 611.51. Tolerances for metal fits. *See also* 615.82.

755.2 ACCESSORIES AND PARTS FOR PUMPS

References.—Rubber pump valves. *See* 707.3.

755.3 HAND PUMPS

References.—Gasoline filling station pumps. *See* 793.6.

756. GAS PRODUCERS

American Society of Mechanical Engineers. Power Test Code. Gas Producers; 1928. Measurements required, preparations, starting and stopping instructions, method of making spot tests and of making short tests, calculation of efficiency and heat balance, itemized forms for tabulation of test data and calculations.

National Board of Fire Underwriters. Internal Combustion Engines and Coal Gas Producers; 1922. For coal gas producers, permissible location, installation requirements for smoke and vent pipes, general structural requirements to take care of particular operating features.

References.—General test code requirements. *See* 700. Oil efficiency for water gas operation. See 997.2. Gas codes and gas testing. *See* 997.2.

METAL-WORKING MACHINERY

760. GENERAL ITEMS

American Drop Forging Institute and National Safety Council, sponsors of American Standards Assn. Serial B 24-1927. Safety Code for Forging and Hot Metal Stamping. Drop forgings and other hammer forgings; includes all hazards peculiar to the forging industry and associated with such machines, but not including cold extrusion of non-ferrous metals or hydraulic presses, except small types of the latter. Hot pressing, bull dozing, bolt heading, and rivet making machines, not included.

National Machine Tool Builders Assn. T-1; 1927. Driving Speeds. Five recommended standard speeds for machine tool drives, two recommended standard speeds for constant speed motors for machine tool drive, recommended standard sizes of machine pulleys resulting in 9 standard ratios between motor and machine speeds.

National Machine Tool Builders Assn. T-2; 1928. Simplified List of Shaft Diameters. Standard shaft diameters for machine tool construction from 1-inch size to 6-inch sizes.

National Safety Council. Approved by American Standards Assn. as B11-1926. Safety Code for Power Presses and Foot and Hand Presses. Covers presses fitted with rams or plungers for blanking, trimming, drawing, punching, or stamping material, plate shears and plate punches. Rules for providing proper foundations, for working space, lighting, means of disconnecting power, guarding of belts, pulleys, shafts, gears, switches, feeding mechanisms, inclosure of ram, limitation of ram stroke, gate guards, two hand tripping devices, sweep guards, etc.

761. MACHINE TOOLS

761.1 LATHES

References.—Standard driving speeds and shaft diameters. *See* 760.

761.2 MILLING MACHINES

References.—Standard driving speeds and shaft diameters. *See* 760.

761.9 MISCELLANEOUS MACHINE TOOLS

References.—Portable electric drills, reamers, buffers, and grinders. *See* 711.24.

762. POWER PRESSES AND FORGING HAMMERS

762.1 POWER PRESSES

References.—Safety codes. *See* 760.

762.2 FORGING HAMMERS

References.—Safety codes *See* 760.

763. THREAD-CUTTING AND SCREW MACHINES

References.—Standard shaft sizes, standard driving speeds. *See* 760.

764. PUNCHING, SHEARING, AND ROLLING MACHINES

References.—Safety code for punching machines and shearing machines. *See* 760.

765. PARTS AND TOOLS FOR METAL-WORKING MACHINERY

American Society of Mechanical Engineers. Woodruff Keys, Keyslots and Cutters. Approved by American Standards Assn. as B 17f-1930. Includes milling cutters for keyslots, dimensions, number of teeth, tolerances for standard sizes of fine and coarse types.

American Society of Mechanical Engineers. National Machine Tool Builders Assn. and Society of Automotive Engineers. Approved by American Standards Assn. as B 5b-1929. Tool Holder Shanks and Tool Post Openings. Standard dimensions of tool shanks, tool post openings, lathe center and lip heights.

American Society of Mechanical Engineers. Joint sponsor with National Machine Tool Builders Assn. and Society of Automotive Engineers under procedure of American Standards Assn. B 5a-1927. T Slots, Their Bolts, Nuts, Tongues and Cutters. Tables of dimensions and tolerances, includes milling cutters.

American Society of Mechanical Engrs. Joint sponsor with Nat'l Machine Tool Builders Assn. and Society of Automotive Engrs. Approved by American Standards Assn. as B 5c-1930. Milling Cutters. Standard nomenclature, diameters, thicknesses, sizes of holes and other important dimensions.

American Society of Mechanical Engrs. Joint sponsor with Society of Automotive Engrs. and Nat'l Machine Tool Builders Assn. Approved by American Standards Assn. as B 5e-1930. Taps, Cut and Ground Threads. Dimensions and tolerances for machine screw taps, hand taps, tapper taps, nut taps, and pulley taps, the same as those recommended by National Screw Thread Commission.

American Society of Mechanical Engineers. American Gear Mfrs. Assn., Society of Automotive Engineers. Roller Chains, Sprockets and Cutters. Approved by American Standards Assn. as B29a-1930. Includes cutters for sprockets, types of space cutters, construction, data for laying out cutter outlines, recommended cutter sizes for standard roller chain and block roller chain sprockets.

American Society for Steel Treating. Handbook page 105; 1927. Recommended Practice for the Heat Treatment of Taps and Milling Cutters. Applies to tools of plain carbon tool steel, 18 per cent tungsten high-speed steel, and 1.50 to 2 per cent tool steel of chemical compositions specified. Instructions for annealing of steel after forging and before machining, and for annealing for removing machining strains.

National Die and Special Tool Builders Assn. Classification Sheets for Dies; 1928. For class A, class AA, class B, and class C dies, requirements on parts to be hardened, provision of automatic stops, dimension tolerances on cutting parts, degree of taper, provision of bushings, assembly and construction, for punch dies.

U. S. Gov., Dept. of Commerce, Bureau of Standards. R36; 1925. Milling Cutters. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes, types, and styles of milling cutters, giving various dimensions and size of hole.

U. S. Gov., Dept. of Commerce, Bureau of Standards. R51-29; 1929. Die-Head Chasers for Self-Opening and Adjustable Die Heads. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes and threads per inch for national coarse thread and fine thread series, for S. A. E. spark plug and bushing thread, for lighting fixture and fitting thread, for railway sizes, and for pipe thread.

U. S. Gov., Dept. of Commerce, Bureau of Standards R115-30; 1930. Full Disk Buffing Wheels.

Simplified practice recommended and accepted by industry covering a standard schedule of stock varieties of buffing wheels, diameters 4 to 20 inches, ply 20.

U. S. Gov., National Screw Thread Commission Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. Recommended practice for taps. For American National coarse and fine thread series, dimensions and tolerances for cut and ground thread machine screw taps, hand taps, tapper taps, nut taps, and cut thread pulley taps, tolerances for taps for special diameters and pitches, taper pipe thread tap dimensions, Acme screw thread tap dimensions and tolerances.

U. S. Gov., National Screw Thread Commission Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. Recommended Practice for threading tools. For single point tool and for multiple tooth chasers and hobs, outline of tooth form, table of dimensions for determining shape of threading tool threads for American National coarse and fine threads, and for standard Acme threads.

References.—Portable electric drills, reamers, buffers and grinders. *See* 711.24. Hack saw blades. *See* 615.62. Abrasive and grinding wheels. *See* 541.3. Carbon tool steel, alloy tool steel. *See* 603.32, 621.35. Heat treatment of tool steels, blanking dies, punches, shear blades. *See* 600.5. Tolerances on metal fits. *See also* 615.82.

766. POWER TRANSMISSION MACHINERY

766.0 GENERAL ITEMS

American Society of Mechanical Engineers, joint sponsor with National Bureau of Casualty and Surety Underwriters and International Assn. of Industrial Accident Boards and Commissions under procedure of American Standards Assn. B 15–1927. Safety Code for Mechanical Power-Transmission Apparatus. Requirements on guards and guarding for connecting rods, cranks, flywheels, shafting, pulleys, belts, link belts, chains, ropes, gears, sprockets, cams, couplings, clutches, counterweights, up to but not including point of operation, requirements for bolts, keys, set screws, and oil cups, rules for care and operation of equipment.

766.1 POWER TRANSMISSION AND CONVEYOR CHAINS AND SPROCKET WHEELS

American Bottlers of Carbonated Beverages. Educ. Bull. No. 4; 1930. Conveyor Chains for Bottling Plant Equipment. For pintle type chain, standard pitch, sprocket width, pin diameter, and link dimensions for 2 standard sizes, strength requirement for chain.

American Petroleum Institute. Standard No. 7; 1930. Transmission Standards. For roller chain, requirements on standard pitches and roller dimensions for 3 sizes, stock chain lengths.

American Society of Mechanical Engineers. American Gear Mfrs. Assn. Society of Automotive Engrs. Roller Chains, Sprockets and Cutters. Approved by American Standards Assn. as B29a–1930. Covers material commonly used in transmission of power in industrial machinery, machine tools, motor trucks, motorcycle and tractor drives, standard nomenclature and dimensions of standard series and extra heavy series of roller chains, test and measuring loads for the standard series. Types, tooth form, and dimensions of sprockets for standard chains and for twin roller chains.

Society of Automotive Engineers 1931 Handbook. Silent Chains; 1917. Over-all width for various chain numbers and pitches up to 7 inches width.

References.—Safety codes. *See* 766.0. Methods of testing, general requirements for metals. *See* 600.1. Cutters for roller chain sprockets. *See also* 765. Tolerances on metal fits. *See also* 615.82.

766.2 BALL AND ROLLER BEARINGS

Assn. of Iron and Steel Electrical Engineers. Report of Special Bearing Committee on Application of Roller Bearings to Mill Type Motors; 1929. Includes data sheets showing the bearing sizes applicable to various size motors, for bearings of various make and motors of various manufacture.

Society of Automotive Engineers. American Society of Mechanical Engineers. Ball and Roller Bearings. Approved by American Standards Assn. as B3–1930. Standard dimensions and tolerences for annular ball bearings, covering dimensions that affect interchangeability of bearings, for light, medium, and heavy series, for wide type of annular ball an roller bearings, recommended practice on dimensions and tolerances that affect interchangeability for regular light, medium, and heavy series, and for extended light and medium series.

Society of Automotive Engineers 1931 Handbook. Ball Bearings; 1930. Dimensions and tolerances for standard bore sizes of annular ball bearings, single row type; annular separable (open) type; angular contact ball bearings; annular ball and roller bearings, wide type; thrust ball bearings of flat face type and self aligning type, single direction and double direction, light, medium, and heavy, inch and metric dimensions.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Lock Nuts and Washers for Ball Bearings. Dimensions and threading of lock nut and shaft, keying of washer, nut, and shaft, for shaft sizes from $\frac{5}{16}$ to 2⅜ inches with assembly shown for retaining ball bearing.

Society of Automotive Engineers 1931 Handbook. Roller Bearings; 1929. Table of dimensions of standard bearings arranged according to bore, with bearing number.

U. S. Gov., Dept. of Commerce, Bureau of Standards R67; 1927. Roller Bearings. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes of roller bearings from ⅝ to 4½ inch size, giving inside and outside diameters and depth.

References.—Steel for ball and roller bearings. *See* 621.31.

766.9 MISCELLANEOUS POWER TRANSMISSION MACHINERY

References.—Leather belting, rubber and balata belting. *See* 066.3, 207.3. Cotton belting, hair belting *See* 314.1. Shafts and shafting. *See* 611.52. Pulleys, pinions and gears. *See* 611.16, 611.55.

767. WELDING AND FLAME-CUTTING MACHINERY

American Bureau of Welding. Bulletin No. 1; 1921. Standards for Testing Welds. For comparing sample welds. Definitions, shop standard tests the bending test; for commercial standard tests, bending and tensile tests; for research standard tests, chemical analysis, bending, tension, fatigue, and metallographic examination of base metal, of weld and of filled-in metal, no specific limits or values given.

American Bureau of Welding. Bulletin No. 3; 1922. Standards for Arc Welding Apparatus.

Recommends subscription to A. I. E. E. standards when such have been prepared. Classification of welding apparatus, definitions, information on apparatus, temperature rise and efficiency requirements by reference to rules of A. I. E. E.

American Bureau of Welding. Bulletin No. 4; 1923. Committee Report. Training Course for Oxy-Acetylene Welders.

American Bureau of Welding. Bulletin No. 5; 1923. Welded Pressure Vessels. Recommendations to Boiler Code Committee of American Society of Mechanical Engineers in their revision of the Code for Unfired Pressure Vessels.

American Bureau of Welding. Bulletin No. 7; 1924. Training Course for Electric Arc Welders. Outline of type jobs and the purpose of each in the training of the welder.

American Bureau of Welding. Test Specimens, Their Preparation and Testing. Journal of American Welding Society, p. 7, vol. 7, Nov., 1928. Specifications which apply only to an investigation being carried on by committee into the properties of welded joints. Qualification tests for welders on fillet and butt welds, for d. c. metal arc and gas arc, welding requirements and gaging of welds on test specimens, inspection, dimensions and types of test specimens used in investigation, procedure for testing and equipment required.

American Bureau of Welding. Committee Report. General Procedure Control for Gas Welding of Aircraft Joints for Investigational Purposes. Journal of American Welding Society, p. 40 of vol. 7, Dec., 1928. Requirements for gas regulators, pressure gauges, welding torches, hose, and goggles, weldability tests of base metal, preparation of material, method of welding, etching, pneumatic leak tests, specifications for welds and welding procedure for testing welders.

American Electric Railway Engr. Assn. Recommended Rules. W124–30; 1930. Rules for Arc Welding. Recommended practice and procedure in welding rail joints, welding cupped rail ends, welding of manganese castings.

American Institute of Electrical Engineers. Standard No. 38. American Bureau of Welding; 1925. Electric Arc Welding Apparatus. Includes d. c. generators, motor generator sets, a. c. transformers, and resistors, used in arc welding. Definitions, duty classification, rating, heating limits and methods of testing, measurement of efficiency, dielectric test, standard values for current and voltage. Efficiency limits not stated.

American Institute of Electrical Engineers. Standard No. 39; 1926. Resistance Welding Apparatus. Applies to resistance welding transformers and apparaus for electro-percussive welding. Definitions, duty classification, rating, heating limits and measurement, measurement of input to transformer, dielectric test.

American Welding Society. Code I, part A; 1928. Code for Fusion Welding and Gas Cutting in Building Construction. General applications of gas cutting and welding, definitions, requirements for welding wire, permissible stresses in weld, design of welded joints for girders, beams, columns, and butt joints, general rules for erection of steel, general rules for gas cutting.

American Welding Society. Arc Welding and Cutting; 1927. Information and instruction for the making of arc welds.

American Welding Society. Resistance Welding; 1927. Instructions for beginners in the operation of resistance welders.

American Welding Society. Thermit Welding; 1927. Instructions for the making of thermit welds.

Assn. of Railway Electrical Engineers 1929 Manual. F–I–II–III. Arc Welding, Spot Welding, Butt Welding. Recommended practice for electric welding and applications to railroad shops and to fabrication of structural steel.

Assn. of Railway Electrical Engineers 1929 Manual. F–VIII; 1928. Gas Welding and Cutting. Equipment for oxyacetylene welding and cutting, care of equipment, welding procedure.

Gas Products Assn., International Acetylene Assn., National Board of Fire Underwriters, National Screw Thread Commission No. 107. Standard Hose Connections for Welding and Cutting Torches; 1925. For two sizes of hose connections, dimensions of nipple, shank and nut, size of thread, right hand thread for oxygen, left-hand thread for fuel gas, N. S. T. C. design and dimensions of gages.

International Acetylene Assn. Drawing No. 101; 1925. Standardized Hose Connection. Standard dimensions and threads for hose nozzles on oxy-acetylene blowpipes for "B" size and "A" size, R. H. thread for oxygen, L. H. thread for fuel gas.

National Board of Fire Underwriters. Gas Systems for Welding and Cutting;; 1931. Capacity of generator, construction and heating of generator house, construction and materials for inside generator compartment, relief piping, permitted use of portable generators, pipe installation and pressure test, construction and strength requirements for header piping connecting gas cylinders, storage requirements for fuel, oxygen cylinders and of calcium carbide.

National Board of Fire Underwriters. Installation and Operation of Acetylene Equipment; 1924. Includes use of acetylene for welding and cutting, location of generator, construction of generator houses, requirements for conductor and relief piping, storage and installation of cylinders of dissolved acetylene.

National Electrical Manufacturers Assn. Handbook of Apparatus Standards; 1928. 114–201. Electric Welding Machines (Direct Current Arc Machine). Requirements on standard ampere rating, basis of rating, voltage ratings, permissible temperature rise at rated load, horsepower ratings of direct connected motors.

Railway Fire Protection Assn. Handbook; 1926. Installation and Operation of Gas Systems for Welding and Cutting. Recommendations on storage of calcium carbide, dissolved acetylene and other fuel gases and oxygen, general requirements on generator house and generator foundation construction, on piping and testing of piping, installation of portable generator, shop rules.

Underwriters' Laboratories. Blowpipes or Torches for Welding, Cutting, Heating, Lead Burning and Soldering; 1928. Requirements on hose connecting unions, general construction of nozzle, test requirements for normal and abnormal operation, definitions.

Underwriters' Laboratories. Portable Automatic Acetylene Generators for Oxy-Acetylene Welding Cutting Systems; 1928. Covers 1-pound and 15-pound pressure types, requirements for automatic operation on overload, permissible metals, construction of joints, types of accessories and assembly, condensation removal, design of operating chamber, carbide holders, feed mechanism, reliefs, connections, flash back check, requirements for stability.

Underwriters' Laboratories. Stationary Automatic Acetylene Generators for Oxy-Acetylene Welding and Cutting; 1928. For 1-pound and 15-pound pressure types, definition of rating, of iron or steel construction, operation as regards heating, stoppage of automatic feed, etc., assembly, removal of condensation, design, thickness of metal, operation of generating chamber, carbide holder, feed mechanism, gas holder, piping, flash-back check, and appurtenances.

U. S. Gov., National Screw Thread Commission Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. American National standard hose connections for Welding and Cutting Torches. Mandatory for material purchased and used by War and Navy Depts. includes requirements on dimensions of hose connections and threading, tolerances on gages, hand designation for threads for oxygen and for fuel gas connections, same as standards of Internat. Acetylene Assn., Gas Products Assn., and Nat. Bd. of Fire Underwriters.

References.—Methods of testing and general requirements for metals. *See also* 600.1. Steel cylinders for shipment of acetylene gas. *See* 956.1. Regulators or reducing valves for cylinders. *See also* 607.6. Gages for cylinders. *See* 793.2. Protective helmets and goggles. *See* 914.5. Safety code for protection of eyes. *See* 914.5. Steel welding rods and wire. *See* 603.26, 603.41. Cast iron welding rods. *See* 611.19. Nickel steel welding wire. *See* 622.4. Aluminum welding rod. *See* 631.31. Brass welding rod. *See* 645.11. Manganese bronze welding rod. *See* 647.23. Monel welding rod. *See* 654.53.

768. FOUNDRIES AND FOUNDRY MACHINERY

American Foundrymen's Assn. and National Founders' Assn. joint sponsors under procedure of American Standards Assn. B 8–1922. Safety Code for the Protection of Industrial Workers in Foundries. To provide safety for life, limb and health, general requirements on construction, upkeep and operation of entrances, floors, pits, galleries, gangways, aisles, foundry equipment, finishing and cleaning machinery, heating and ventilation, protective clothing, and allowable duties of female workers.

References.—Refractories for the malleable industry. *See* 534.12. Plumbago crucibles. *See* 574. Foundry patterns. *See* 429.9. Sintering test for foundry sand. *See* 512.10. Protective helmets and goggles. *See* 914.5. Foundry facings, carbon base. *See* 575.1. Silica mold wash. *See* 593. Carbon electrodes for electric furnaces. *See* 575.2.

770–779 TEXTILE, SEWING, AND SHOE MACHINERY

770. GENERAL ITEMS

American Assn. of Textile Chemists and Colorists; 1928. Launder-Ometer. Standard laundry machine for laboratory washing tests for testing fastness of dyed textile materials. Authorized manufacturer, Atlas Electric Devices Co., Chicago, Ill.

American Society for Testing Materials D 76–27; 1927. Textile Testing Machines. Inclination balance or pendulum type, requirements on angle of pendulum, minimum drum dimension, type and limiting dimensions for fabric and skein jaws, and machine speed.

National Safety Council. Safety Code for Textiles. Approved by American Standards Assn. as L1–1929. Published by U. S. Dept. of Labor, Bureau of Labor Statistics. A standard for safeguarding textile machinery and equipment by concerns operating such machinery and by the manufacturers of textile machinery and equipment, provides for guards and safe operating features for machines and equipment.

References.—Methods of testing cotton fabrics. *See* 300.4.

771. KNITTING AND LACE-MAKING MACHINERY

References.—Safety code for textile machinery. *See* 770.

772. COTTON-MANUFACTURING MACHINERY

References.—Safety code for textile machinery. *See* 770.

773. WOOL-MANUFACTURING MACHINERY

References.—Safety code for textile machinery. *See* 770.

774. JUTE MACHINERY

References.—Safety code for textile machinery. *See* 770.

775. SEWING MACHINES

References.—Safety code for textile machinery. *See* 770.

776. SHOE MACHINERY

780–789 MISCELLANEOUS INDUSTRIAL PLANT MACHINERY

781. WEIGHING, PACKAGING, BOTTLING, AND MAILING MACHINERY

American Bottlers of Carbonated Beverages. Educ. Bull. No. 4; 1930. Carbonating Equipment Units. Recommended practice on number of drums comprising gas outfit and number of drums in operation, minimum size of regulator for various capacities of carbonators.

American Bottlers of Carbonated Beverages. Educ. Bull. No. 4; 1930. Carbonator Connections. Standard minimum pipe sizes for water supply for various capacities of carbonators, dimensions of standard swivel and union nut connections for carbonator-filler carbonated water connections for various carbonator capacities.

References.—Conveyor chains for bottling plant. *See* 766.1.

782. CHEMICAL-PLANT EQUIPMENT, CEMENT PLANT, PULP AND PAPER, AND CLAY-WORKING MACHINERY

National Safety Council. Approved by American Standards Assn. as P1–1925. Safety Code for Paper and Pulp Mills. Safety rules covering unloading and storage of pulp wood, guarding of saws, hand barkers, barking drums, etc., guards and safe operation in rag and old paper preparation, acid making, chemical processes of making pulp, preparing pulp for paper machine, machine room, and finishing room.

783. GLASS-FACTORY EQUIPMENT, PAINT MACHINERY, BREWERS MACHINERY, RUBBER-MILL MACHINERY

International Assn. of Industrial Accident Boards and Commissions. National Safety Council. Sponsors. Approved by American Standards Assn. as B 28a–1927. Safety Code for Rubber Mills and Calenders. Requirements on installation of safety-trip controls and quick-stop facilities, determination of distance of travel of rolls, limits on stopping distances.

784. WOODWORKING MACHINERY

784.0 GENERAL ITEMS

International Assn. of Industrial Accident Boards and Commissions. National Board of Casualty and Surety Underwriters. Sponsors. Approved by American Standards Assn. as O 1–1930. Safety Code for Woodworking Plants. General requirements on conditions of floor and aisles, recommended and maximum speeds of circular saws, requirements on types, installation of guards, inclosures, etc., for various woodworking machines, veneer machinery, and cooperage machinery, operating rules.

U. S. Gov., Dept. of Commerce, Bureau of Standards H5; 1923. Approved by American Standards Assn. as B 13–1924. American Logging and Sawmill Safety Code. Requirements on structural features, provision of guards, and rules of operation and procedure, which increase safety for employees, covering felling and logging, sawmill operations, sawmill machinery, and yard operations.

784.1 WOODWORKING MACHINERY

785. REFRIGERATING, ICE MAKING, AND ICE-CREAM MACHINERY

785.0 GENERAL ITEMS

American Society of Mechanical Engrs. and American Society of Refrigerating Engrs. Test Code for Refrigerating Systems. Requirements on measurements to be made, kinds of measuring instruments, starting and stopping test, duration of run, calculation of output expressed in standard tons of refrigeration, formulas and methods of calculation of horsepowers, efficiencies, performance of auxiliaries, heat balance, etc., test data forms for compression system and for absorption system.

American Society of Refrigerating Engineers. Safety Code for Mechanical Refrigeration; 1928. Approved by American Standards Assn. as B9–1930. Definitions, classification of refrigerating systems, restrictions on location, required minimum test pressures, specifications for safety devices and their use, operating precautions.

American Society of Refrigerating Engineers. Circular No. 3; 1926. Test Code for Steam Driven Ice Manufacturing Plants. Required measurements, for capacity and economy test, method of obtaining economy of plant.

American Society of Refrigerating Engineers. Circular No. 4; 1926. Standard Ton of Refrigeration. Adopted by American Society of Mechanical Engineers, Refrigerating Machinery Assn. and National Assn. of Practical Refrigerating Engineers. Definition of the standard ton of refrigeration, the standard commercial ton of refrigeration and the standard rating of a refrigerating machine, tables of properties of saturated vapors of various refrigerants at standard-ton-of-refrigeration saturation-temperatures and of properties of superheated ammonia vapor at pressures corresponding to standard-ton-of-refrigeration saturation-temperatures.

785.1 REFRIGERATING SYSTEMS

Refrigerating Machinery Assn. Compression System of Refrigeration; 1925. Specifications for installation in a form suitable for incorporation in a construction contract. Gives main and auxiliary equipment to be installed by the refrigerating contractor leaving types and ratings for determination and insertion on the individual contract. Includes pressure test requirements for castings, ammonia coils, and ammonia piping, and use of safety devices in accordance with Am. Soc. Refrig. Engrs. safety code.

References.—Definitions, testing code, safety code. *See* 785.0, 700. Air compressors. *See* 791.2. Cast iron. *See also* 611.11. Shafts and forged steel. *See also* 611.52, 611.51. Copper tubing for refrigerators. *See also* 642.24. Household refrigerators. *See* 959.4. Synchronous motors for compressors. *See* 711.21.

785.2 ICE-CREAM MOLDS

U. S. Gov., Dept. of Commerce, Bureau of Standards R120–31; 1931. Ice Cream Brick Molds and Cartons. For ice cream brick mold, simplified practice recommended and accepted by industry establishing dimensions of one standard size of mold.

786. BAKERY MACHINERY

American Society of Bakery Engineers. Bulletin 43; 1929. Dump Bins, Blending Bins, Storage Bins. Maximum dumping heights and volume for dump and blending bins, volume per 100 pounds of unsifted and of sifted flour for storage bins.

American Society of Bakery Engineers. Bulletin 43; 1929. Flour Hoppers. Minimum angle, shape, material, and capacity.

American Society of Bakery Engineers. Bulletin 43; 1929. High-Speed Dough Mixers. Maximum height, minimum openings for ingredients, flour, and water, dumping height and water jacket pressure for various standard capacities.

American Society of Bakery Engineers. Bulletin 43; 1929. Sifters and Bolters. Standard capacities, maximum mesh of screen over storage bin and of screen over hopper.

References.—Water tanks for bakery. *See* 956.2.

787. LAUNDRY MACHINERY AND APPLIANCES

Assn. of Governmental Officials in Industry in U. S. and Canada. Laundryowners National Assn. National Assn. of Mutual Casualty Companies. Sponsors. Approved by American Standards Assn. as Z 8–1924. Safety Code for Laundry Machinery and Operations. Requirements for the provision of interlocks, guards, enclosures, trip bars, etc., for washing machines, extractor, starching, drying, finishing machines, etc., operating rules.

Laundryowners National Assn. L. N. A. Formulas for Washroom Practice; 1928. In form of 3 wall charts. Requirements on softness of water, size of load, washwheel speeds, water levels, bath formulas and laundry procedure for white goods, colored goods, stockings, overalls, knit underwear, woolens, butchers aprons, white curtains, silks and rayons, etc.

Laundryowners National Assn. Manual of Standard Practice for the Power Laundry Washroom; 1927. Text book on alkalies, soaps, bleaching, sours, blues, starches, etc., their properties and application to laundering; includes standard formulas for washes for bundles of various degrees of soiling, number, temperature, and composition of baths, duration of rinse, etc.

Laundryowners National Assn. Removal of Stains; 1928. In form of 2 wall charts. Procedure for removal of various listed stains in cotton, linen, wool, silk goods and in colored garments, preparation of solutions required.

National Board of Fire Underwriters. Dry Cleaning and Dry Dyeing Plants; 1925. Construction of buildings, acceptable types and construction for ventilating, heating, light and power equipment, construction, installation and equipment requirements for tanks, purifiers, clarifiers, pumps, washers, drying tumblers, extractors, separators, stills, and scouring tables, operating requirements, fire protection, and air conditioning.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Collar former and edger. Requirements on mounting and thickness of curved steel or iron band, use of electrically heated iron, automatic maintenance of uniform ironing pressure, finish.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Collar ironers. For one size using one padded roll and one steam heated roll, dimensions of rolls, requirements on material and mounting of rolls, kinds and amount of cloth for padded roll, provision of pressure, feeding, and safety devices, electrical equipment and loading of motor in accordance with standards of Nat. Elec. Mfrs. Assn.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Draw dry rooms and truck dry rooms. Requirements on sizes, dimensions, number of draws, thicknesses of galvanized iron or steel, construction of draws, casing, trucks, provisions for heating and ventilating.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Drying tumblers. Household types not included, electrical parts and permissible loading of motor in accordance with standards of Nat. Elec. Mfrs. Assn., for recirculating type and once-through type, requirements on standard dimensions and capacities, evaporation test, materials, thicknesses of sheets, and structural features of shell and cylinder, types of delinting devices, fans, heating coils, air circulation, control of drying and cooling periods, motor controllers, interlocking device, etc.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Flat work ironers, cylinder type and chest type, not including household types, requirements on ironing capacity, material and structural features of frame, guards, steam cylinders, steam chests, rolls, ribbon feeds, aprons, sizes of cylinders and rolls, electrical equipment and motor loading according to standards of Nat. Elec. Mfrs. Assn.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Hot tube collar shaper. Of vertical type for mounting on table top, requirements on size of porcelain lined cast iron tube, provision for steam heating, structural features.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Ironing boards. Not including household types, requirements on height of cast-iron frame, thickness, and dimensions of white wood ironing top, dimensions of sleeve board, provision of dampening cup, electric outlet for iron, pilot light.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Laundry presses. For 4 types, dimensions of ironing surface and types of garments to which applicable, requirements on materials and structural features of head and buck, hydrostatic pressure test of head and buck, structural features of manual operated, electrically operated, and steam operated types, heating by steam, operating features.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Over-driven and under-driven extractors. Household types not included, electrical parts and permissible loading of motor according to standards of Nat. Elec. Mfrs. Assn., standard diameters, capacities, and speeds, requirements on structural features of curb, frame, base, basket, spindle and bearings, provision and operating features of timer, brake, safety cover, location of electric motor, type of controller, etc.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Seam dampeners. Of gravity type with cast-iron base for table mounting, provision and operation of water reservoir and dampening means, provision of automatic tripping device, needle valve for spout, material and finish of parts.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Soap kettles. Requirements on construction using galvanized iron or steel, or of noncorrodible alloy, provision of steam pipe valve, capacity 30 or 60 gallons, thickness of metal.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Starch cookers. Requirements on capacities, thickness of inner and outer shells of copper or noncorrodible metal, thickness of asbestos insulation, mounting, provision of cover, steam and drain connections, blow-off cock, content indicator.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Truck tubs. Requirements on dimensions of tub of galvanized iron or steel, thicknesses of metal and construction of sides and bottom, size of wheels, provision of wooden drain board and of drain cock.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Washing Machines. Not covering household types, electrical appliances according to standards of Nat. Elec. Mfrs. Assn., requirements on standard dimensions and capacities of cylinder, construction of shell and cylinder, use of noncorrodible alloy plates, thickness of plates, provision of doors, noiseless gears, gage, thermometer, and piping, sizes of pipe and outlets, type and operation features of electrical controller, interlocking and reversing provisions, guards and protection.

U. S. Gov., Federal Specifications Board OO–L–131; 1931. Laundry Appliances. Wood stationary tubs. For cypress tubs, requirements on thickness of wood, dimensions of compartments, height, size of drain, provision of metal legs.

References.—Testing machine for resistance of fabric to laundering. *See* 770. Electric motors, electric controllers, starters. *See* 711.2, 714.11. Cast iron, malleable cast iron. *See also* 611.11, 611.21. Steel plates and sheets. *See also* 604.1, 604.2. Galvanized sheets. *See also* 604.32. Lumber for tanks and tubs. *See also* 413.1. Insulating coverings. *See also* 707.4. Copper sheets. *See also* 641.21, 641.23. Valves and cocks. *See also* 607.6. Laundry and starch tables. *See* 613.6 Launder-Ometer for testing textiles. *See* 770.

788. TYPESETTING, PRINTING, AND BINDING MACHINERY

International Assn. of Electrotypers of America. Standards for Electrotypes; 1930. Standard thicknesses of unmounted electrotypes (ad plates and patent bases), thickness of curved plates, angle of bevel of patent base plates, and standard formula for electrotype backing metal.

789. INDUSTRIAL PLANT MACHINERY NOT ELSEWHERE CLASSIFIED

American Railway Assn. Mechanical Div. Recommended Practice. Standard Blocking for Cradles of Car Dumping Machines; 1919. Illustrated layout of blocking, thickness and recommended materials for plank, etc.

National Board of Fire Underwriters. National Fire Protection Assn. U. S. Dept. of Agriculture. Sponsors. Approved by American Standards Assn. as Z 12b–1930. Pulverizing Systems for Sugar and Cocoa. Regulations to reduce hazard of ignition and propagation of fire, location of plant, material and thickness of walls, proportion of glass in walls, types and applicability of fire doors, requirements on electric power and lighting, operation and care of pulverizing machinery, fire protection.

National Board of Fire Underwriters. National Fire Protection Assn. U. S. Dept. of Agriculture. Sponsors. Approved by American Standards Assn. as Z 12c–1927. Prevention of Dust Explosions in Starch Factories. Construction and arrangement of buildings, bins, kilns, regulations for grinding, grading, handling of materials, for removal of suspended dust and static dust and prevention of ignition.

National Board of Fire Underwriters. National Fire Protection Assn. U. S. Dept. of Agriculture. Sponsors. Approved by American Standards Assn. as Z 12d–1928 and Z 12e–1928. Prevention of Dust Explosions in Flour and Feed Mills. Prevention of Dust Explosions in Terminal Grain Elevators. Requirements on arrangement and construction of buildings, bins, regulations for grinding, grading, handling of materials, for removal of suspended dust and static dust and prevention of ignition.

National Fire Protection Assn. Joint sponsor with U. S. Dept. of Agriculture. Approved by American Standards Assn. as Z 12f–1930. Regulations for Coal Pneumatic Cleaning Plants. For prevention of dust explosions, regulations on construction of building, screen room arrangement, window arrangement, ventilation and dust collection, regulations for coal driers and storage bins, fire and explosion protection, electric wiring.

References.—Motors and controllers for explosive atmospheres. *See also* 711.25, 714.11. Blower and exhaust systems. *See* 791.0.

790–799 MISCELLANEOUS INDUSTRIAL PLANT AUXILIARY EQUIPMENT

791. BLOWERS AND COMPRESSORS

791.0 GENERAL ITEMS

American Society of Mechanical Engineers. Power Test Code. Displacement Compressors and Blowers; 1925. Applies to both piston and rotary apparatus of the positive displacement type. Measurements required, instructions for measurement of dimensions, method of computing volume of air compressed, computation of air horsepower, volumetric, mechanical, compression, and overall efficiency, forms for tabulating test data and calculations.

National Assn. Sheet Metal Contractors. Standard Practice in Sheet Metal Work; 1929. Section VII. Blow Pipe and Exhaust Systems. Typical designation and application of various types of fans, typical designs illustrated with sizes of ducts, thickness of sheet metal, for exhausting dust, fumes, etc., in various industrial plants, and for conveying dust, instruments and methods of testing blower systems.

National Board of Fire Underwriters. Blower and Exhaust Systems; 1929. Covers heating and ventilating systems, systems for removal of flammable vapors, dust, stock and refuse conveying systems, requirements for fire resistive construction of ducts, automatic dampers for duct passages through walls, location of motors, protection of openings, location of fans and ducts, thickness of metal and general construction of conveyor ducts, construction and sizes of dust collectors and refuse receptacles.

791.1 FANS AND BLOWERS

American Society of Heating and Ventilating Engineers. National Assn. of Fan Manufacturers. Standard Test Code for Disk and Propeller Fans, Centrifugal Fans and Blowers. 1931. Definitions and formulas, drawings and instructions for set-up of apparatus, required observations and calculations, performance and efficiency curves.

National Assn. of Fan Manufacturers. Standard Method of Designating Discharge and Rotation for Centrifugal Fans, Arrangement or Drive. 16 standard designations of discharge and rotation illustrated and defined, 7 standard arrangements of belt and direct connected drive.

References.—Test codes. *See also* 791.0, 700. Ventilation systems. *See* 791.0. Portable desk and wall fans. *See* 711.23. D. c. motors for ventilating fans. *See* 711.22.

791.2 COMPRESSORS

Compressed Air Society. Trade Standards; 1930. For air compressors, description of low pressure nozzle test for measurement of air flow, recommended speeds for belt driven, steam driven, and electric driven compressors for various piston strokes, installation, plant layout, lubrication requirements and care of compressor plants standard pressures and capacities.

References.—Test codes. *See also* 791.0, 700. Compressors for refrigerating machinery. *See* 785.0, 785.1. Synchronous motors for compressors. *See* 711.21.

792. HEATING AND VENTILATING EQUIPMENT

792.0 GENERAL ITEMS

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Heating; 1926. Covers two pipe gravity hot water heating, and one and two pipe gravity steam heating systems, general installation, insulation, support, and equipment requirements.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Hot Air Heating; 1926. General installation requirements.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Hot Blast Heating System; 1926. For hot air distributed by fans, general design and installation.

American Society of Heating and Ventilating Engrs. Code on Heating and Ventilating Garages; 1929. Requirements on types and thickness of walls, permissible types and capacities of electric motors, heating systems, and ventilating systems.

American Society of Heating and Ventilating Engineers. Standard Test Code for Heat Transmission Through Walls; 1928. Definitions and formulas, method of test, construction of guarded hot box, construction of test specimens.

National Board of Fire Underwriters. Blower and Exhaust Systems; 1929. Covers heating and ventilating systems, systems for removal of flammable vapors, dust, stock and refuse conveying systems, requirements for fire resistive construction of ducts, dust and refuse collectors, etc.

National Research Council, Committee on Heat Transmission. Standard Test Codes; 1928. Test codes for determining the thermal conductivity of insulations in the 100° to 1000° F. field, of building materials and wall construction, and of solid electrical insulations. Recommended standard test procedure for flat and for cylindrical forms of insulation of various types, includes guarded hot plate method for flat pieces.

792.1 HEATING EQUIPMENT

American Soc. of Heating and Ventilating Engrs. Industrial Unit Heater Assn. Code for Testing and Rating Steam Unit Heaters; 1930. For fan unit heaters using steam as a heating medium, definitions, rating to include fan speed, heat output, air delivery, horsepower consumption of fan, final temperature, with standard conditions of steam and air defined as a basis of rating, test apparatus and test procedure for rating test.

National Assn. Sheet Metal Contractors. Standard Practice in Sheet Metal Work; 1929. Section VI. Heating and Ventilating. Requirements on suitable materials, minimum sheet metal weights, sizes and spacing of angle iron stiffeners for various sizes of ducts, requirements on fittings, descriptions and illustrations of typical duct systems, typical methods of duct construction and installation, for residences, office buildings and industrial buildings.

References.—Heating systems, heat transmission tests. *See also* 792.0. Electric heaters. *See* 717.1. House heating boilers and radiators. *See* 614.0, 614.4. Heating equipment for power and heating boilers. *See* 703.9. Sheet iron and steel. *See also* 604.2, 604.3. Fans and blowers. *See also* 791.1. Gas and gas appliances. *See* 997.2. Gasoline vapor machines and systems. *See* 997.4. Acetylene equipment for heating. *See* 997.5.

792.2 VENTILATING EQUIPMENT

National Assn. Sheet Metal Contractors. Standard Practice in Sheet Metal Work; 1929. Section VI. Heating and Ventilating Requirements on suitable materials, minimum sheet metal weights, sizes and spacing of angle iron stiffeners for various sizes of ducts, requirements on fittings, descriptions and illustrations of typical duct systems, typical methods of duct construction and installation, for residences, office buildings, and industrial buildings.

References.—Ventilation systems. *See also* 792.0. Safety code for coal mine ventilation. *See* 751. Blowers and fans. *See* 791.1, 791.0. Sheet iron and steel. *See also* 604.2, 604.3.

793. MEASURING AND RECORDING APPARATUS

793.0 GENERAL ITEMS

American Society of Mechanical Engineers. Power Test Code. Instruments and Apparatus. Part I. General Considerations; 1928. Items affecting accuracy of measurements, items affecting the accuracy of instruments, their sluggishness, sensitivity and variance, and suggestions relative to calibration in consideration of these effects.

793.1 COUNTERS, TAXIMETERS, SPEEDOMETERS

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of U. S. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Taximeters. Requirements on permissible bases on which fare shall be calculated, kinds of indications and their readibility, marking with statement of rates, provision of flag, permanence of construction, permissible tolerances on indications for mileage tests and time tests.

National Conference on Weights and Measures. Report of 23rd Conference. Published as M116 of U. S. Bureau of Standards; 1930. In agreement with standards recommended by Bur. of Standards for adoption by the States. Odometers. Tentative specifications applicable to commercial instruments for determining charges for hire of a vehicle, requirements on actuation of indicators, readibility and visibility of indications, provision for sealing, permanence of functioning, tolerances on accuracy of indications. Includes hubometers, cable driven odometers and mileage recording parts of speedometers.

793.2 GAUGES, EXCEPT DIMENSION GAGES

American Marine Standards Committee. E No. 2–1926. Specifications for Pressure and Vacuum Gauges for Ships. Standard requirements on parts, sizes of dial and figures, standard scales, pipe thread connections, endurance and calibration test requirements for pressure, vacuum, ammonia, oil and air gauges.

Associated Factory Mutual Fire Insurance Companies. Water Pressure Gauges; 1924. Of noncorrodible materials, construction of tube, movement, dial and ring, pressure test requirements for tube.

Underwriters' Laboratories. High Pressure Gas Gauges; 1922. For high pressure containers of gases used in welding and cutting, internal explosion test requirements, accuracy of indication requirements on original calibration, and after over pressure test, impulse test, and vibration test, minimum size of dial.

References.—Water level gauge glass, lubricator glasses. *See* 526.6. Calibration of gauges. *See also* 793.0. Dimensional gages, hand gages. *See* 615.82.

793.3 INDICATORS, ENGINE CYLINDER

793.4 WATER METERS

American Water Works Assn., New England Water Works Assn.; 1923. Cold Water Meters, Compound Type. Definition of type, bronze or cast iron case, indication requirements for dials, dimensions and design of connections, construction requirements for measuring chambers, pistons, and wheels, for gear trains, strainers, and controlling valves, accuracy of registration, capacity and working pressure requirements, recommended tests, care of meters.

American Water Works Assn., New England Water Works Assn.; 1923. Cold Water Meters, Current Type. Cases of bronze or cast iron, indication requirements for dials, construction requirements for measuring cages, measuring wheels, gear trains, accuracy of registration and capacity requirements, for meters, working pressure, recommended tests for capacity, registration and pressure, test equipment required, care of meters.

American Water Works Assn., New England Water Works Assn.; 1923. Cold Water Meters, Disc Type. For outer case of bronze or cast iron, indication requirements for dials, dimensions and threads of connections, construction requirements for disks, meter chambers, gear trains, and strainers, requirements on accuracy of registration, capacity for giving loss of head, and working pressure, equipment needed to test meters, recommended tests for capacity, registration, and pressure, standard lengths of meters, care of meters.

American Water Works Assn., New England Water Works Assn.; 1923. Cold Water Meters, Fire Service Type. Definition of type, bronze or cast-iron case, indication requirements for dials, dimensions and designs of connections, construction and design requirements for measuring chambers, pistons and wheels, for gear trains, main line and by-pass valves, accuracy of registration, capacity, and working pressure requirements, recommended tests, test equipment, care of meters.

References.—Calibration of meters. *See also* 793.0. Cast iron. cast bronze. *See also* 611.11, 646.41.

793.5 WEIGHING SCALES AND BALANCES

American Assn. of State Highway Officials. Tentative Specifications for the Bin Batcher Type of Equipment for Weighing Concrete Aggregates; 1930. Requirements on general structural features of bin and hopper, some dimensions and operating features of hopper, general structural features of beam or springless dial types of scales, provision of indicating means for warning of nearness of required load, required scale accuracy, test weight equipment.

American Railway Assn. Grain Circular No. 1; 1920. Automatic Scales. Specifications indorsed by Interstate Commerce Comm. for weighing of bulk grain on railroads, requirements on structural features, scale graduation, sensibility reciprocal, operation, excess capacity, installation, test requirements for ratio, sensibility reciprocal, and repetition of readings.

American Railway Assn. Grain Circular No. 1; 1920. Hopper Scales. Specifications endorsed by Interstate Commerce Comm. for weighing bulk grain on railroads, requirements on structural features, scale graduations, minimum travel of beam, sensibility reciprocal, maximum unit stresses permissible, installation, test requirements for accuracy, rules for weighing grain.

American Railway Assn. Grain Circular No. 1; 1920. Track Scales. Specifications endorsed by Interstate Commerce Comm. for weighing bulk grain on railroads, for heavy service type and for light service type, permissible working stresses, standard scale lengths, physical property requirements for various steels used for pivots and knife-edges, design and mounting requirements for pivots, nose irons, lever fulcrum stands, weigh beams, etc., requirements on graduation, sensibility reciprocal, design features and some dimensions of foundation, pit, scale house, deck, etc., required sizes of weigh bridge girders, rules for weighing.

American Railway Engineering Assn. 1929 Manual. Yards and Terminals. Four Section Railway Track Scales; 1920. Knife-edge scales, heavy and light service classes, allowable working stresses for iron and steel parts, knife-edge bearings, formulas for stress calculations, standard scale lengths, general design requirements for scale levers, pivots, knife-edges, and other scale parts, requirements for sensibility reciprocal, and tolerance on field test, general design requirements for concrete foundations, scale pit, approach walls, scale beam house, weigh bridge girder and bracing, approach rails, deck, dead rails and dead rail beams, rules for location, maintenance and testing routine for track scales, design requirements for master scales and test weight cars.

American Railway Engineering Assn. 1929 Manual. Yards and Terminals. Motor Truck, Built-In, Self-Contained and Portable Scales for Railway Service; 1927. Knife-edge scales of straight and torsion lever type, capacity and sizes, corner and end loading capacities, allowable working stresses, formulas for stresses, scale tolerances, general design requirements for scale levers, pivots, knife-edges, and other scale parts, foundations, scale beam house or box, platforms, and approaches.

American Railway Engineering Assn. 1929 Manual. Yards and Terminals. Nonretroactive Tolerances for Heavy Duty Automatic Indicating Scales; 1925. Not applicable to track scales or those that automatically weigh out commodities. Tolerances in excess or deficiency, on ratio and on dial or beam for various loads.

American Railway Engineering Assn. 1929 Manual. Yards and Terminals. Two Section Knife Edge Railway Track Scales; 1927. For weighing without use of dead rails or relieving gear, 2 capacity classes, allowable working stresses, formulas for stress sensibility reciprocal requirements and scale tolerance, general design requirements for scale lever, pivots, knife-edges and other scale parts, foundation, scale beam house, weigh-bridge girders and bracing, approach rails and deck.

American Road Builders' Assn. Convention Proceedings; 1931. Standardization of Weighing Devices for Concrete Aggregates. Covers weighing devices to be used in connection with small mixers for bridge and similar structure work, general requirements on scales, levers, and pivots, provision for leveling, scale equipment to be provided and their general characteristics, tell tale dials, accuracy of weighing, provision of test weights.

American Road Builders' Assn. Convention Proceedings; 1930. Standardization of Weighing Devices for Concrete Aggregates. Recommended specifications, same as the specifications of Am. Assn. of State Highway Officials for the bin batcher type of equipment for weighing concrete aggregates.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Prescription Scales and Balances. For 2 classes dependent on accuracy, requirements on graduation markings of scales and indicators, leveling provision, sensibility reciprocal, allowable tolerances on measurement, material in knife-edges and bearings, etc.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Cream Test and Butterfat Test Scales. Requirements on scale graduation, leveling provision, sensibility reciprocal, shift of weight test, tolerance on measurement.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of National Bureau of Standards; 1929, with some revisions in M116 as adopted at 23rd national conference. Scales. General Specifications. Definition of rated capacity, requirements on use of hardened steel for knife-edges and bearings, structural features, minimum width of graduations, definitions of balance and sensibility reciprocal.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Computing Scales. Requirements on value intervals on computing chart, location of indicators for weight and value, size and spacing of graduations, leveling provisions, tolerances on measurement.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Spring Scales. Requirements on size and spacing of graduations, structural and design features, tolerances on accuracy of indications and for shift of load test at half capacity.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Suspension Scales of the Lever Type. For large sizes and for small sizes the specifications and tolerances of platform scales and of counter scales, apply respectively.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards;

1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Wheel-Load Weighers. Used for determining the axle loads of trucks on highways, requirements on accuracy.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Large Capacity Automatic-Indicating Scales. Not including railroad or counter scales, tolerances on accuracy of indications, kind of material for knife-edges, etc.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Counter Scales. Requirements on general structural features, material of bearings, limits on size and spacing of graduations, leveling provisions, allowable sensibility reciprocal, allowable tolerances on measurements.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Platform Scales, including counter platform scales, requirements on general structural features, use of hardened steel in bearings, etc., level adjustment, weighing test for corner loadings, travel of beam in trig-loop, sensibility reciprocal, allowable tolerances in measurement for 2 classes of scales.

National Conference on Weights and Measures. Report of Twenty Third Conference. Published by Nat. Bureau of Standards as M116; 1930. Specifications and Tolerances for Automatic Indicating Scales. Definition, requirements on width of graduations and clear intervals, zero graduation, clearances between indicator and face, accessibility of adjustable parts, tolerances to be those of class of scale to which the individual scale belongs.

National Scale Mens Assn. Bull. No. 1, 1929 with Supplements A and B, 1930. Overhauling and Repair of Heavy Capacity Scales. For knife-edge type scales, requirements on repair and replacement of pivots and bearings, hardness of pivots, repair of weighbeams and accessories, accuracy in setting pivots, protection from corrosion, setting of reinstalled scales, weighing performance of reinstalled scales.

National Scale Mens Assn. Bull. No. 2; 1930. Light Industrial Service Track Scales. For cars weighing less than 180,000 pounds and wheel base of 45 feet or less, for knife-edge scales only, requirements on length, sectional capacity, permissible working stresses in materials, requirements for materials, design, and mounting of pivots, knife-edges, bearing blocks, design of weigh beam, fulcrum stands, etc.

National Scale Mens Assn. Bull. No. 3; 1931. Railway Track Scale Test Weight Cars. For cars which are essentially test weights, self-contained type and compartment type, requirements on weight and weight limits, all metal construction, two axle construction, uniform distribution of load, no air brakes, frictionless bearings, drainage, etc., types of wheels, axles, couplers, etc.

U. S. Gov., Dept of Commerce, Bureau of Standards C83; 1920. Specifications for the Manufacture and Installation of Railroad Track Scales. Prepared by a joint committee of Am. Rwy. Assn., Am. Rwy. Engr. Assn., Railroad and Warehouse Commission of Minn., Nat'l Scalemens Assn., Scale Mfrs. Assn., and Bureau of Standards. Does not cover scales for weighing of grain. Permissible stresses for various materials used, for knife-edge bearings, and for concrete bearings, formulas for stresses in loops and projecting pivots, standard scale lengths, physical requirements of materials and design of pivots and knife edges, design requirements and mounting of various scale parts, design requirements for foundations, scale beam house, scale weigh bridges, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards C199; 1925. Hand-Operated Grain Hopper Scales. Informally approved by Interstate Commerce Commission. Requirements on permissible working stresses in various materials, in steel pins, and in concrete, design requirements on levers, nose irons, pivots, knife edges, bearings, loops, lever and beam fulcrum stands, weighbeam, hopper, and foundation, installation, test requirements.

U. S. Gov., Dept. of Commerce, Bureau of Standards C333; 1927. Specifications for the Manufacture and Installation of Two-Section, Knife-Edge Railroad Track Scales. Adopted by Am. Rwy. Engr. Assn., approved by Nat'l Scale Mens Assn. and Scale and Balance Mfrs. Assn. See Am. Rwy. Engr. Assn. for description of specifications.

U. S. Gov., Dept. of Commerce, Bureau of Standards T199; 1921. Method for Precision Test of Large-Capacity Scales. Outlines a scientific and systematic method used by the bureau for testing railroad master and grain hopper scales, includes means for accurately measuring the position of the beam.

U. S. Gov., Federal Specifications Board 314; 1925. Railroad Track Scales. The specifications and tolerances set forth in Nat. Bureau of Standards publication C83, 1920, "Specifications for Manufacture and Installation of Railroad Track Scales," shall be complied with.

U. S. Gov., Federal Specifications Board 473; 1927. Weighing Scales. A general specification applicable to all types of commercial scales closely following the general specifications for scales adopted by Nat'l Conference on Weights and Measures with some additional material included from Am. Rwy. Engr. Assn. specifications for motor truck, built-in, self-contained, and portable scales for railroad service.

References.—Weights for use with scales and balances. *See* 919.1. Railway cars. *See also* 726.1.

793.6 LIQUID MEASURING DEVICES

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Liquid Measuring Devices. For mechanically operated retail dispensing devices such as gasoline pumps, requirements on level installation, units of delivery, indication of filled condition and amount of delivery, sensitiveness, constancy of delivery, elapsed time test for constancy, structural features of pointers, indicators, graduations, and positive stops, time allowed for completion of delivery, permissible types of computing charts, permissible tolerances on measurements of liquid. Publication M116 of Bureau of Standards on Report of 23rd Conference gives permission to use word "full flow" on meters.

Underwriters' Laboratories. Hand Operated Discharge Devices; 1929. For dispensing motor fuels at auto filling stations, design requirements, assembly, operating characteristics, material, minimum thicknesses of material, of base, housing, pump and pump parts, piping, accessories, and electrical equipment, hydrostatic pressure and operating test requirements.

Underwriters' Laboratories. Outside Visible-Measure Discharge Devices; 1929. For dispensing motor fuels at filling stations, design and minimum metal thicknesses for iron or steel base and housing, structural and operating requirements for various types of pumping units and control mechanisms, design, construction and assembly of measuring compartment, hydrostatic pressure, leakage test.

Underwriters' Laboratories. Power Operated Discharge Devices; 1929. For dispensing motor fuels at filling stations, design and minimum thickness of metal of iron or steel base and housing, design requirements for pumping unit stuffing box, visible indicators, other appurtenances, installation of piping, accessories, and electrical equipment, hydrostatic pressure and operating test requirements.

Underwriters' Laboratories. Power-Operated Pumps and Discharge Device Accessory Pumps; 1929. For use with dispensing devices for motor fuel at filling stations, design requirements, material, and minimum thicknesses of metal for iron or steel base, pump body, stuffing box, piston rod, and other pump parts, piping, and relief valve, hydrostatic pressure and operating test requirements.

U. S. Gov., Federal Specifications Board. 362; 1925. Liquid Measuring Devices, Retail Type. This specification is based upon and closely follows the text of the code of specifications and tolerances for liquid measuring devices adopted by the National Conference on Weights and Measures.

References.—Other power operated pumps. *See* 755.1. Water meters. *See* 793.4.

793.7 GREASE-MEASURING DEVICES

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Grease Measuring Devices. Tentative specifications, requirements on units of delivery, sensitiveness, constancy of delivery, structural features of indicators, graduated scales, positive stops, allowable tolerances on measurements of grease. Revised as regards indication of delivery in Report of 23rd Conference, B. S. publ. M116. 1930.

793.9 MISCELLANEOUS MEASURING AND RECORDING APPARATUS

References.—Fabric measuring devices. *See* 390.4. Electric meters. See 714.3. Standard weights and measures. *See* 919.1.

794. LUBRICATING DEVICES

American Railway Assn. Mechanical Div. Lubricators, Fittings for; 1926. Dimensions and designs of standard pipe joints and fittings, and of holding arm, number of threads.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Lubricator Cups; 1921. Capacity, dimensions of glass, size of taper pipe thread for 8 sizes.

Society of Automotive Engineers 1931 Handbook. Recommended Practice. Oil and Grease Cup Threads; 1928. Width of hexagon, size, length of threaded section, and number of threads for pipe thread fittings and for machine screw fittings.

795. MECHANICAL GOVERNORS

American Society of Mechanical Engineers. Power Test Code. Speed-Responsive Governors; 1927. Scope is limited to the performance of speed responsive governors as applied to steam or hydraulic turbines, reciprocating steam or gas engines when used for driving electric generators, mills, etc., and does not include speed limit safety stops. Tests for determining speed regulation with variable and constant load, tests for sensitiveness, rapidity, and governing force, itemized form for tabulating test data and calculations.

References.—General requirements for test codes. *See* 700. Steam turbines. *See* 701.2.

800-899 CHEMICALS AND ALLIED PRODUCTS

800-809 COAL-TAR PRODUCTS

801. CRUDE COAL-TAR PRODUCTS

801.1 BENZENE (BENZOL)

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Benzene. Reagent for chemical analysis, physical properties, identity tests, test requirements for purity.

References.—Testing of lacquer solvents and diluents. *See* 822.0.

801.2 TOLUENE

References.—Testing of lacquer solvents and diluents. *See* 822.0.

801.3 CREOSOTE AND WOOD PRESERVATIVES

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Preservative for Creosoted Wood Blocks. For coal-tar paving oil and for coal-tar distillate oil as preservatives, requirements on content of distillate of coal gas or coke oven tar, permissible water and matter insoluble in benzol, specific gravity, distillation, float test and coke residue.

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Timber Preservatives. For creosote oils and creosote-coal-tar solution for pressure treatments, for anthracene oil and heavy creosote oil for surface treatment, requirements on permissible water, fluidity, permissible matter insoluble in benzol, specific gravity, distillation ranges, float test, and coke residue.

American Assn. of State Highway Officials. Tentative Method T–60. Undated. Methods of Sampling and Analysis of Creosote Oil. Same as D 38–30 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method T–61. Undated. Method of Test for Coke Residue of Creosote Oil. Same as D 168–30 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method T–62. Undated. Method of Test for Distillation of Creosote Oil. Same as D 246–30 of Am. Soc. for Testing Materials.

American Assn. of State Highway Officials. Tentative Method T–74. Undated. Method of Test for the Determination of the Specific Gravity, 38°/15.5° C., of Creosote Fractions. Same as D 38–30T of Am. Soc. for Testing Materials.

American Electric Railway Engr. Assn. Recommended Specification WP108–26; 1926. Specification for No. 1 Grade Creosote Oil (For Pressure Treatments). Allowable percentage of water and of matter insoluble in benzol, specific gravity, percentage distilling at given temperatures and the percentage coke residue.

American Electric Railway Engr. Assn. Recommended Specification WP109–26; 1926. Specification for No. 2 Grade Creosote Oil (for pressure treatments). Allowable percentage of water and of matter insoluble in benzol, specific gravity, percentage distilling at given temperatures, and coke residue.

American Electric Railway Engr. Assn. Recommended Specification WP110–26; 1926. Specification for No. 3 Grade Creosote Oil (for pressure treatments). Allowable percentage of water and of matter insoluble in benzol, specific gravity, percentage distilling at given temperatures, and coke residue.

American Electric Railway Engr. Assn. Recommended Specification WP111–26; 1926. Specification for Creosote-Coal-Tar Mixture (for pressure treatments). Required percentage of distillate of coal tar, allowable percentage of water and of matter insoluble in benzol, specific gravity, percentage distilling at given temperatures, and coke residue. Precautions in purchase and use of the mixture.

American Electric Railway Engr. Assn. Recommended Specification WP114–29; 1929. Preservative Oils Suitable for Nonpressure Open Tank, Brush and Spray Treatments. For anthracene oil and for heavy creosote oil, requirements on specific gravity, fluidity, percentage of water and of matter insoluble in benzol, distillation test, float test, coke residue, test methods of Am. Rwy. Engr. Assn.

American Electric Railway Engr. Assn. Recommended Specification WP115–26; 1926. Specification for Heavy Creosote Oil Suitable for Brush and Open Tank Treatment. Allowable percentage of water and of matter insoluble in benzol, liquid state and specific gravity at definite temperatures, percentage distilling at definite temperatures, coke residue.

American Electric Railway Engr. Assn. Recommended Specification WP116–26; 1926. Methods of Sampling for Creosote Oils. Continuous drip sample and sampling from small containers.

American Electric Railway Engr. Assn. Recommended Specification WP118–26; 1926. Determination of Specific Gravity of Creosote Oil. Drawings and specified dimensions of apparatus, test procedure.

American Electric Railway Engr. Assn. Recommended Specification WP119–26; 1926. Determination of Matter Insoluble in Benzol for Creosote Oils. Drawing and specification of apparatus, test procedure.

American Electric Railway Engr. Assn. Recommended Specification WP120–26 as revised in 1927 on page 194 of 1927 Proceedings of A. E. R. E. A. Specifications for Distillation of Creosote Oil. Dimensioned drawings and specifications of apparatus, preparation of sample and test procedure.

American Electric Railway Engr. Assn. Recommended Specification WP121–26; 1926. Determination of Specific Gravity of Fractions of Creosote Oils. Recommends Westphal balance for liquid fractions and platinum or nickel pan of dimensions shown for solid and semisolid fractions, method of test.

American Electric Railway Engr. Assn. Recommended Specification. WP122–26; 1926. Specification for Float Test of Residue (Creosote Oil Analysis). Dimensioned drawings and specifications for aluminum float and specification for low softening point thermometer, preparation of sample and test procedure.

American Electric Railway Engr. Assn. Recommended Specification WP123–26. Determination of Coke Residue (Creosote Oil Analysis). Apparatus and test procedure.

American Electric Railway Engr. Assn. Recommended Specification WP124–26; 1926. Specification for Analysis of Carbolineum and Similar Oils. Procedure for determining specific gravity, separation of solids, flashing point, burning point, sulphonation residue, tar acids, solubility in benzol, ash, and description of distillation apparatus and method.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Creosote. Description and properties, preparation and standard strengths of tincture, dilutions, and medications.

American Railway Engineering Assn. 1929 Manual and 1930 Supplement to Manual. Wood Preservation. Measuring, Sampling and Analyzing Preservatives; 1926. For creosote, standard method of sampling from tank cars, apparatus and procedure for determination of water, matter insoluble in benzol, specific gravity, distillation, specific gravity of fractions, float test, and coke residue.

American Railway Engineering Assn. 1929 Manual. Wood Preservation. Preservatives; 1926. For 3 grades of creosote and 1 grade of creosote coal-tar solution, allowable percentage of water and of matter insoluble in benzol, specific gravity, fractional distillation quantities and temperatures, float test, residue.

American Railway Engineering Assn. 1929 Manual. Wood Preservation. Treating Processes; 1927. Includes water-gas-tar solution in place of creosote for the zinc chloride and creosote-card process of treatment. For the distillate of water-gas-tar, permissible water, and matter insoluble in benzol, specific gravity, distilling temperatures, float test, and residue.

American Society of Municipal Engineers. Creosoted Wood Block Paving; 1921. Includes preservative oils, moisture content, solubility, specific gravity, distillation fractions, and residue requirements for coal tar paving oils, coal tar distillate oil, and refined water gas tar.

American Society for Testing Materials. D 38–30; 1930. Methods of Sampling and Analysis of Creosote Oil. Requirements for taking continuous drip sample from loading or discharge pipe, dimensions and design of test apparatus and test procedure for determination of water, matter insoluble in benzol, specific gravity, and distillation; float test of residue and coke residue test by A. S. T. M. methods D 139 and D 168.

American Society for Testing Materials. Tentative Method of Test D 38–30T; 1930. Test for the Determination of the Specific Gravity, 38°/15.5° C., of Creosote Fractions. For relatively small amounts of the distillation fractions, test procedure using pycnometer method.

American Society for Testing Materials. D 43–25; 1925. Creosote Oil for Priming Coat with Coal Tar Pitch in Damp Proofing and Waterproofing Below and Above Ground Level. For application to concrete and masonry surfaces, method of sampling, requirements on dryness, consistency, specific gravity, insolubility in benzol, and distillation test using A. S. T. M. method of analysis, D 38.

American Society for Testing Materials. D 168–30; 1930. Method of Test for Coke Residue of Creosote Oil. Requirements on dimensions of crucible, test procedure using residue obtained from "tentative method of test for distillation of creosote oil," A. S. T. M. serial D 246–27T.

American Society for Testing Materials. D 246–30; 1930. Method of Test for Distillation of Creosote Oil. Method suitable to all types and grades of creosote and to mixtures with tars and oils used for timber preservation. Dimensions of distilling flask, condenser, etc., dimensions and design of thermometer, preparation of sample, test procedure.

American Society for Testing Materials. Tentative Definitions D324–30T; 1930. Definitions of Terms Relating to Timber Preservatives. Definitions of creosote, creosote coal-tar solution, creosote distillate, coal tar, coal-gas tar, coke-oven tar, and water-gas tar.

American Wood Preservers' Assn. 3b; 1931. Definition of Creosote.

American Wood Preserver's Assn. 4c; 1924. Creosote Oil for Ties and Structural Timbers. Requirements for allowable water, insoluble matter, specific gravity, distillation, float test, coke residue for 3 grades in accordance with A. W. P. A. test method for creosote.

American Wood Preserver's Assn. 5a; 1923. Creosote Coal-Tar Solution for Ties and Structural Timber. Requirements on allowable water, insoluble matter, specific gravity, distillation, float test, coke residue, using A. W. P. A. method of analysis for creosote.

American Wood Preservers' Assn. 6b; 1926. Float Test of the Residue in Creosote Oil. Includes a total immersion mercury thermometer, dimensions, design, graduation, standardization, permissible scale error, graduated from —2° to 80° C. or 30° to 180° F.

American Wood Preserver's Assn. 7c; 1931. Method for the Determination of Coke Residue in Creosote Oil. Design of crucible, test procedure using residue from distillation test of A. W. P. A. Standard Distillation of Creosote Oils, 11c.

American Wood Preserver's Assn. 8a; 1921. Method for the Determination of the Amount of Material Insoluble in Benzol. Requirements for apparatus, test procedure where oil is subjected to direct washing by the boiling vapors of the solvent.

American Wood Preserver's Assn. 9b; 1931. Method for the Determination of the Specific Gravity, 38°/15.5° C., of Creosote Fractions. For small quantities, test procedure using pycnometer, calculations.

American Wood Preserver's Assn. 10c; 1929. Method for Determination of Amount of Water in Creosote Oil. Procedure using still and condenser for determination of water in the distillate obtained in A. W. P. A. Standard Distillation of Creosote Oil, 11c. Alternate method of distilling the sample with a volatile solvent where no other work is to be done on the creosote.

American Wood Preserver's Assn. 11c; 1929. Standard Distillation of Creosote Oil. Dimensions and design of distilling flask, condenser tube, shield, thermometer, assembly of apparatus, preparation of sample, test procedure.

American Wood Preserver's Assn. 13b; 1929. Volume and Specific Gravity Factors for Creosote Oil. Table of factors for use in correction of specific gravity and volume of oil at 60° to 220° F. to the values at 100° F.

American Wood Preserver's Assn. 15a: 1923. Preservatives for Flooring and Paving Blocks. Includes coal-tar paving oil and coal-tar distillate oil, requirements on allowable water, insoluble matter, specific gravity, distillation, float test, and coke residue tests in accordance with A. W. P. A. method for analysis of creosote.

American Wood Preserver's Assn. 18b; 1931. Method for the Determination of Specific Gravity of Creosote Oil. Test procedure using hydrometer and cylinder.

American Wood Preserver's Assn. 24c; 1929. Preservative Oils for Nonpressure Treatments. For 3 grades of creosote oil for open-tank treatment, 1 grade for brush of spray treatment, and 1 grade of anthracene oil, requirements on fluidity, specific gravity, percentage water, insoluble matter, distillation, float test, and coke residue, tests according to A. W. P. A. standard analysis of creosote.

American Wood Preserver's Assn. 25b; 1931. Method of Sampling Creosote Oil in Tank Cars. Dimensions and design of sampling cylinder, procedure using zone sampling method and tables of combining factors for computing percentage of water in tank.

American Wood Preserver's Assn. 26a; 1923. Methods for Determination of Tar Acids in Creosote Oil. Dimensions and design of tar-acid separatory funnel, test procedure for distillation method and for liberation method.

American Wood Preserver's Assn. 31a; 1924. Water-Gas Tar Distillate for Use with Zinc Chloride. Requirements on allowable water, insoluble matter, specific gravity, distillation, float test, and coke residue, tested in accordance with A. W. P. A. standard analysis of creosote.

American Wood Preserver's Assn. 32a; 1924. Water-Gas Tar Solution for use with Zinc Chloride. Requirements on composition, percentage water, insoluble matter, specific gravity, distillation, float test, and coke residue, tested in accordance with A. W. P. A. standard analysis methods for creosote.

National Electric Light Assn. Suggested Specifications D90–28T; 1928. Tentative. Pole Stain. Covers coal-tar distillate or coal-tar creosote for the preservative treatment of wood, requirements on purity, specific gravity, melting point, solubility, water content, distillation, coke residue.

U. S. Gov., Federal Specifications Board. TT–W–556; 1931. Coal Tar Creosote Wood Preservative for Ties and Structural Timbers. The technical requirements of this specification are the same as those of spec. No. 4c of the Am. Wood Preservers Assn.

U. S. Gov., Federal Specifications Board. TT–W–561; 1931. Creosote Wood Preservative for Brush and Spray Treatment. The technical requirements of this specification are the same as those of spec. No. 24c of the Am. Wood Preservers' Assn.

U. S. Gov., Federal Specifications Board. TT–W–566; 1931. Creosote Coal Tar Solution, Wood Preservative for Ties and Structural Timbers. The technical requirements of this specification are the same as those of Spec. No. 5a of the Am. Wood Preservers Assn.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Creosote. As a medicinal, physical properties, specific gravity, distillation test and other test for purity and identity, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Zinc chloride as wood preservative. *See* 839.38. Pressure process, brush and open tank processes of preservative treatments of lumber. *See* 400.42, 400.43. Creosote carbonate, medicinal agent. *See* 803.23.

801.4 NAPHTHALENE, NAPHTHOL

American Institute of Homeopathy, Homeopathic Pharmacopoeia of the U. S.; 1914. Naphthalin. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Preservatives and Artificial Sweeteners. Beta-Naphthol. Tentative method of qualitative test for presence of.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Naphthalene. Sample No. 38a prepared and sold by the bureau with a certificate giving calorimetric value, for use in industry and by others as a standard in calorimetry.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Betanaphthol. A naphthalene used for medicinal purposes, description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

801.5 CRUDE COAL TAR

References.—Crude coal tar. *See* 505.3.

801.6 REFINED COAL-TAR OIL

References.—Coal-tar oil. *See* 505.37.

801.8 XYLENE (XYLOL)

References.—Testing of lacquer solvents and diluents. *See* 822.0.

802. INTERMEDIATE COAL-TAR PRODUCTS

802.1 ACIDS

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Carbolic Acid. Description and properties, preparation and standard strengths of tincture, dilutions, and medications for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Benzoic Acid, Picric Acid, Salicylic Acid. Descriptions and properties, preparation and standard strengths of triturations, tincture, dilutions, and medications for medicinal purposes.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Drugs. Acetylsalicylic acid. Tentative methods for determination of melting point, presence and amount of free salicylic acid, official and tentative methods for determination of total salicylates and combined acetic acid.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Preservatives and Artificial Sweeteners. Benzoic Acid. Preparation of sample, qualitative test and quantitative test methods.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Preservatives and Artificial Sweeteners. Salicylic Acid. Preparation of sample, qualitative test and quantitative test methods.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Salicylic Acid in the Presence of Other Phenols. Tentative method for determining amount of salicylic acid.

U. S. Gov., Dept. of Commerce. Bureau of Standards. C25 and Suppl.; 1927. Standard Samples. Benzoic acid. Sample No. 39c prepared and sold by the bureau, for use in industry and by others as a standard in checking acidimetric and calorimetric values, preparation of standard solutions, etc.

U. S. Gov., Dept. of Commerce. Bureau of Standards. S183; 1912. Benzoic Acid as an Acidimetric Standard. Gives comparative test results from standardizing hydrochloric acid with benzoic acid as compared with other methods, states some of the advantages in using benzoic acid as a standard in acidimetry and alkalimetry.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Acetylsalicylic Acid. As a medicinal, strength requirements, physical properties, tests for identity and purity, assay tests for strength, dosage. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Benzoic Acid. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Phenol, Carbolic Acid. As a medicinal, physical properties, test for identity and purity, assay test for strength, minimum strength requirement, dosage. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Picric Acid. As a chemical reagent for testing and as a medicinal, physical properties, test for identity, test requirements for purity, dosage. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Pyrogallol (Pyrogallic Acid). For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Salicylic Acid. As a chemical reagent and also as a medicinal, physical properties, tests for identity, test requirements for purity and assay test for strength, average dosage. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Trinitrophenol (Picric Acid). For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

802.2 ANILINE OIL AND SALTS

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Anilin. Description and properties, preparation and standard strengths of tincture and dilutions for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Anilin Sulphate. Description and properties, preparation and standard strengths of triturations.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Acetanilid and Acetphenetidin (Phenacetin). Tentative Methods. Tests for presence of acetphenetidin, preparation of reagents and determination of acetanilid and of acetphenetidin.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Acetanilid and Caffeine. Tentative Methods. Preparation of sample and reagent, determination of caffeine and of acetanilid.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Acetanilid and Sodium Salicylate. Tentative Methods. Preparation of sample, determination of amount of acetanilid and of sodium salicylate.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Acetanilid. For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

802.3 DIPHENYLAMINE FOR SMOKELESS POWDER

803. FINISHED COAL-TAR PRODUCTS

803.1 COAL-TAR COLORS, DYES, AND STAINS

803.10 General Items

American Assn. of Textile Chemists and Colorists 1930 Year Book. Tabulation of American Dyes. Tabulated list of American dyes, listed alphabetically and according to color index numbers, reference table for finding corresponding Schultz numbers, classification of dyes as acid, mordant acid, mordant, oil, vat, direct, etc.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Coloring Matters in Foods. Tentative Methods. Commercial Coal-Tar Food Colors. Determination of moisture, matter insoluble in water, sodium chloride, sodium sulfate, sulphated ash, metals, arsenic, ether extractives, sulphur, color acid, pure dye, matter insoluble in carbon tetrachloride, water extractives, melting point, etc.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Tentative Methods. Coloring Matters in Foods. Methods for separation of insoluble pigments, of water-soluble coal tar dyes, of oil-soluble coal tar dyes, separation and identification of permitted coal tar food colors, identification of coal tar dyes by changes in color with acids and alkalies, separation and identification of natural coloring matters.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Laboratory Test No. 20. To Determine the Class of Dye in Fabric. Test methods for the dyes turkish red, para red, direct red (benzo, diamine, congo, etc.), sulphur black, aniline black, and logwood black, test for direct colors and for basic colors, to distinguish sulphur from indigo blue, sulphur from mineral khaki, and indigo blue from indianthrene blue.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. Dept. Bulletin 1390; 1927. Chemistry and Analysis of the Permitted Coal-Tar Food Dyes. Methods of analysis of 12 coal-tar food dyes permitted under Federal food and drugs act, covering ponceau 3R, amaranth, erythrosine, orange I, naphthol yellow S, tetrazine, yellow A B, yellow O B, guinea green B, light green S. F. yellowish, fast green F. C. F., and indigotine.

References.—Standard color card for fabrics. *See* 306.0. Methods of testing fastness of dyestuffs on fabrics. *See* 300.4.

803.11 Indigo, Natural and Synthetic

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Indigo. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

Laundryowners National Assn. Laundry Supplies. Undated. Blues. Requirements on color, solubility and method of use given in general terms.

803.12 Color Lakes

803.13 Coal-Tar Food Colors

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 3 and Suppl. No. 2; 1929. Certification of Coal-Tar Food Colors. List of coal-tar dyes which may be certified by Dept. of Agriculture as safe for food colors when application and test affidavit are made in accordance with regulations, minimum allowable percentages of pure coal tar color in package. Comprises Ponceau 3R, amaranth, erythrosine, Ponceau SX, orange I, naphthol yellow S, tartrazine, yellow AB, yellow OB, sunset yellow FCF, guinea green B, light green SF yellowish, fast green FCF, indigotine, brilliant blue FCF.

References.—Methods of test and analysis. *See* 803.10.

803.19 Miscellaneous Coal-Tar Colors, Dyes, and Stains

Commission on Standardization of Biological Stains. Specifications of Certain Stains; 1927. Published in Stain Technology for Jan., 1927. Aniline blue, water soluble; brilliant cresyl blue; congo red; eosin B; light green, sf, yellowish; methyl green; nile blue sulfate; rose bengal; phloxine; toluidine blue O. Requirements on color index number, maximum value on absorption curve, dye content, stain test.

Commission on Standardization of Biological Stains. Specifications for Stains. Published in Stain Technology for July, 1931. Includes methyl orange, congo red, brilliant green, methyl violet, crystal violet, acid fuchsin, safranin O, methylene blue, chemical names and formulas, requirements on appearance, solubility in alcohol and in water, behavior with acids and with alkalies, and dye content. The Commission tests and certifies stains, there now being 50 stains on a certification basis.

U. S. Gov., Federal Specifications Board. 318; 1925. Eosin Y (C. I. No. 768). Requirements on solubility in water, color of water solutions and alcohol solutions, color reactions with various acids, dye content and other ingredients, absorption curve test, hydrogen ion shift test.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Sodium Indigotindisulphonate (Indigo Carmine). For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Color numbers. *See* 803.10.

803.2 COAL-TAR MEDICINALS

803.21 Dichloramine–T

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Creosote Carbonate, medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

803.22 Xylene

803.23 Creosote Carbonate

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Cresote Carbonate. For medicinal purposes, description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Creosote as a medicinal agent. *See* 801.3.

803.24 Orthocresol, Cresol

American Pharmaceutical Assn. National Formulary; 1926. Orthocresol. Description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Cresol. For medicinal purposes, description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Commercial cresol, coal tar dips. *See* 803.4.

803.25 Thymol

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Thymol. Tentative methods for determining percentage of thymol.

803.29 Miscellaneous Coal-Tar Medicinals

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Phenolphthalein in Tablets. Methods for preparation of sample and reagents, and for determination of purity.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Acetphenetidin (Phenacetin) and Caffeine. Tentative Methods. Preparation of sample, determination of amount of each of above constituents.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Acetphenetidin (Phenacetin) and Salol. Tentative Methods. Determination of amount of each in a sample of the mixture.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Drugs. Acetylsalicylic Acid. Methods for determination of melting point, presence and amount of free salicylic acid, official and tentative methods for determination of total salicylates.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Drugs. Methylene Blue. Methods for preparations of sample and for determination of amount of methylene blue.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Phenolthalein in Chocolate Preparations. Tentative method for determining the amount of phenthalein.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Acetphenetidin. For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Phenolphthalein, Phenolsulphonphthalein, Phenyl Salicylate. For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

References.—Creosote, medicinal agent. *See* 801.3. Betanaphthol, naphthalene, medicinal agents. *See* 801.4. Carbolic acid, benzoic acid, picric acid, salicylic acid, acetylsalicylic acid, pyrogallic acid, picric acid, as medicinal agents. *See* 802.1. Aniline, acetanilid, as medicinal agents. *See* 802.2. Indigo, as medicinal agents. *See* 803.11.

803.3 EXPLOSIVES

References.—Explosives, fireworks and ammunition. *See also* 860–869.

803.31 Picric Acid

References.—Picric acid as a medicinal and as a chemical reagent. *See* 802.1.

803.32 Trinitrotoluol

803.4 Coal-Tar Dips and Disinfectants

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Caustic Poisons. For commercial cresol, saponified cresol solutions, coal-tar dips and disinfectants, kerosene solutions of phenols, etc., official methods for the determination of cresol.

809. MISCELLANEOUS COAL-TAR PRODUCTS

809.1 SYNTHETIC TANNING MATERIALS

U. S. Gov., Dept. of Commerce, Bureau of Standards T316; 1926. Analysis of Synthetic Tanning Materials. Methods found most satisfactory and reliable at the Bureau for the determination of acidity, total sulphur, total inorganic matter, free sulphuric acid and sulphates, nonvolatile matter, total organic matter, and tanning material.

References.—Vegetable and other tanning materials and methods of test and analysis. *See also* 231.

809.2 INK POWDER

References.—Iron gallotannate ink powder. *See* 933.1.

809.3 PHOTOGRAPHIC DEVELOPER, METOL

U. S. Gov., Federal Specifications Board O-M-571; 1931. Metol. The sulphate of mono-methyl-para-aminophenol, requirements on solubility tests and mercuric acetate test for identity, permissible ash, test requirements for presence of foreign compounds such as metals and other phenolic substances and poisons.

810–819 MEDICINAL AND PHARMACEUTICAL PREPARATIONS

810. GENERAL ITEMS

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the United States; 1914. Lists several hundred drugs, mostly plant drugs, gives names and synonyms, description of plant, its habitat, the part used for drug purposes, the methods of preparation and standard strengths of tinctures, dilutions, medications, triturations, etc., as used in homeopathic medicine.

American Medical Assn. New and Nonofficial Remedies; 1931. Contains a descriptive list of the proprietary drugs and medicines with the name of the manufacturers, such articles having met the rules of the A. M. A. as regards giving compositions and identification tests, absence of advertising, absence of unwarranted therapeutic claims, etc. The listing of an article does not imply a recommendation by the A. M. A. Does not contain articles given in U. S. Pharmacopoeia.

American Pharmaceutical Assn. National Formulary; 1926. Drugs and Chemicals. Standards for crude drugs and their purity; for chemicals, with test requirements for identity and purity; not covered in U. S. Pharmacopoeia. Recognized as standards in enforcement of Federal food and drugs act.

American Pharmaceutical Assn. National Formulary; 1926. Medicinal Preparations. Standard formulas including proportions of ingredients and method of preparation for a great number of elixirs, plasters, emulsions, extracts, fluid extracts, glycerites, infusions, liniments, solutions, lotions, mixtures, mulls, oils, pastes, pills, powders, effervescent salts, spirits, syrups, tablets, tinctures, ointments, etc. Recognized as standards in enforcement of Federal food and drugs act.

American Pharmaceutical Assn. Pharmaceutical Recipe Book, First Edition. Provides formulas for pharmaceutical preparations that are not recognized in the U. S. Pharmacopoeia or the National Formulary. It is not recognized as standard in the enforcement of the Federal food and drugs act.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Radioactivity of Foods and Drugs. Official method for determining the presence of radioactivity in clear solutions of drugs and waters and method for determining the amount of radium present.

U. S. Gov., Congress. 34 Stat. 768. June 30, 1906, as amended. (For text see S. R. A., F. D. No. 1, 1930, of Food, Drug, and Insecticide Administration of Dept. of Agriculture.) Federal food and drugs act. An act to prevent the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors, and for regulating traffic therein. Defines conditions which will be considered as adulteration or misbranding for drugs, confectionery, and foods, adopts for drugs the standards of U. S. Pharmacopoeia and Nat. Formulary.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., F. D. No. 1; 1930. Regulations for Enfoorcement of Federal food and drugs act. Act applies to foods and drugs shipped in interstate commerce or offered for foreign shipment, standard methods of analysis to be those of U. S. Pharmacopoeia and National Formulary, and of Assn. of Official Agricultural Chemists, regulations regarding the labeling of drugs that do not meet the standards of U. S. Pharmacopoeia or Nat. Formulary, regulations on powdering, poisonous or deleterious ingredients, and colors and preservatives, ingredients which require a statement on label, etc. Includes text of act as amended.

U. S. Gov., Treasury Dept., Bureau of Prohibition, Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Toilet, medicinal and antiseptic preparations. For such materials in which alcohol is a part, the regulations require the addition of given amounts of any of 6 modifying agents in order to be classed as nonbeverage.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Tenth Edition. Standards for Drugs and Medicines. Covers crude drugs, chemical compounds, elixirs, emulsions, extracts, fluid extracts, infusions, tinctures, triturations, liniments, solutions, oils, ointments, pills, powders, and spirits, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Medical and surgical supplies for ships, standard list. *See* 915.50.

811. ALKALOIDS AND SALTS

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Apomorphin Hydrochlorid. Description and properties, maximum dose, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Atropine, Atropine Sulphate. Description, chemical properties, sources, standard triturations, tinctures, dilutions, and medications, methods of preparation.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Cinchona or

China, and Cinchonin Sulphate. Descriptions and chemical properties, source, preparation and standard strengths of tinctures, dilutions, medications, and triturations of cinchona and of triturations of cinchonin sulphate.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Cocaine Hydrochlorid. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacoepia of the U. S.; 1914. Codeine. Description and chemical properties, test of identity, standard strength and method of preparation for homeopathic medicine.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Hydrastine. Description, chemical properties, source, preparation and standard strengths of triturations.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Hyoscyamin Sulphate. Description, chemical properties, source, preparation and standard strengths of triturations, permissible maximum dose.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Ipecac, Nux Vomica, and Opium. Descriptions, properties, parts used in medicines, preparation and standard strengths of tinctures, dilutions, medications and triturations.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Iron and Quinin Citrate, Iron and Strychnin Citrate. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Morphine, Morphine Acetate, Morphine Hydrochloride, and Morphine Sulphate. Descriptions, chemical properties, identity tests, preparation of triturations, maximum dosage.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Quinine, Quinin Arsenate and Arsenite, Quinin Hydrochloride, Quinin Sulphate. Descriptions, chemical properties, identity tests, maximum dosages for the arsenic salts, preparation and standard strengths of triturations.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Stramonium or Thorn Apple. Description and properties, parts used, preparation and standard strengths of tincture, dilutions, and medications.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Strychnine Nitrate, Strychnine Phosphate, and Strychnine Sulphate. Description and chemical properties, maximum dosage, methods of preparation and standard strengths of triturations.

American Pharmaceutical Assn. National Formulary; 1926. Cinchonine Sulphate. Description and physical properties, test requirements for identity and purity, dosage. Recognized as standard in enforcement of Federal food and drugs act.

American Pharmaceutical Assn. National Formulary; 1926. Hydrastine Hydrochloride. Description and physical properties, test requirements for identity and purity, dosage. Recognized as standard in enforcement of Federal food and drugs act.

American Pharmaceutical Assn. National Formulary; 1926. Quinidine. Description and physical properties, test requirements for identity and purity, dosage. Recognized as standard in enforcement of Federal food and drugs act.

American Pharmaceutical Assn. National Formulary; 1926. Strychnine. Description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Acetanilid and Caffeine. Preparation of reagents and of solution of sample, tentative methods for determination of caffeine and of acetanilid.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Acetanilid, Caffeine, and Codeine. Tentative Methods. Preparation of sample, determination of amount of each of above constituents.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Acetanilid, Caffeine, and Quinine. Tentative Methods. Preparation of sample, determination of amount of each of above constituents.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Acetanilid, Caffeine, Quinine, and Morphine. Tentative Methods. Preparation of sample, determination of each of above constituents.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Antipyrin and Caffeine. Tentative methods for determination of amount of antipyrin and of caffeine.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Apomorphine in Tablets. Tentative method for determining amount of apomorphine hydrochoride.

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Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Bioassay of Drugs. Method of determining percentage of total alkaloid in unknown solutions using the cat-eye procedure.

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Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Cocaine. Methods for determination of amount of cocaine.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Codeine in Tablets. Preparation of sample, tests for presence of and for amount of codeine.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Diacetylmorphine (Heroin) in Tablets. Tests for identity and for purity.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Emetine Hydrochloride in Tablets. Tentative method for determination of amount of emetine hydrochloride.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Ephedrine in Inhalants. Ephedrine in Tablets. Tentative methods for identifying and for determining the amount of ephedrine.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Assay of Ergot. Tentative method of determining amount of the alkaloid in unknown solutions by tests with rabbits.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Fluidextract of Ipecac. Tentative method for preparation of solution and determination of amount of ipecac.

Assn. of Official Agricultural Chemists. Official and Tentatitve Methods of Analysis; 1930. Michrochemical Tests for Alkaloids. For alkaloids in compounds and for hypodermic tablets, method of preparing sample, examination under microscope, and identifying the alkaloid through type of crystals formed with various reagents.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Morphine in Tablets. Tests for presence of and for amount of morphine.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Pilocarpine. Tentative method for determination of amount of pilocarpine.

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Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Separation of Quinine and Strychnine. Tentative method of separation and determining amount of each alkaloid.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Strychnine in Liquid Preparations. Strychnine in Tablets. Tests for purity, other alkaloids being absent.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Aconitine, Apomorphine Hydrochloride, Atropine; Cocaine, Cocaine Hydrochloride, Codeine, Codeine Phosphate, Codeine Sulphate Colchicine, Cotarnine Chloride, Emetine Hydrochloride, Ethylmorphine Hydrochloride, Homatropine Hydrobromide, Hyoscyamine Hydrobromide, Morphine Hydrochloride, Morphine Sulphate, Physostigmine Salicylate, Pilocarpine Hydrochloride, Pilocarpine Nitrate, Quinidine Sulphate, Quinine and compounds of Quinine, Strychnine Nitrate and Sulphate. Physical properties, test requirements for identity and for purity, dosage. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Belladonna Leaves and Roots, Cinchona, Hydrastis, Hyoscyamus, Ipecac, Nux Vomica, Opium. Description and physical properties of unground and powdered materials, assay test for percentage of alkaloids, dosage. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Extract of Stramonium. Pilular and powdered extracts, composition, preparation, test requirements for percentage of alkaloid, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810. Powdered extracts of alkaloids. *See also* 819.1.

812. BIOLOGICAL MEDICINALS

U. S. Gov., Congress. 37 Stat., 832; Mar. 4, 1913. An act making appropriations for the Dept. of Agriculture for the fiscal year ending June 30, 1914. The Virus-Serum-Toxin Law. Authorizes Sec. of Agriculture to inspect viruses, serums, etc., for domestic animal treatment, to inspect plants for manufacture, to issue permits for importation, to issue licenses for manufacture, to make regulations, etc. Copy of act appears in B. A. I. Order 276 of Dept. of Agri.

U. S. Gov., Congress. Public—No. 244; 1902. An act to regulate the sale of viruses, serums, toxins, and analogous products in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes. Requirements on licensing of manufactures and labeling of products of above types. Reprinted in Misc. Publication No. 10 of U. S. Public Health Service.

U. S. Gov., Dept. of Agriculture, Bureau of Animal Industry, B. A. I. Order 276; 1922. Regulations Governing the Preparation, Sale, Barter, Exchange, Shipment, and Importation of Viruses, Serums, Toxins, and Analogous Products Intended for Use in the Treatment of Domestic Animals. Includes hog-cholera virus and anti-hog-cholera serum, regulations fixed by law on preparation, tests requirements for virulence and purity of virus and for potency and purity of serum, shipment and labeling regulations.

U. S. Gov., Treasury Dept. U. S. Public Health Service. Hygienic Lab. Bull. 21. The Standardization of Diphtheria Antitoxin.

U. S. Gov., Treasury Dept. U. S. Public Health Service. Hygienic Laboratory Bulletin No. 43; 1912. The Standardization of Tetanus Antitoxin. Mandatory for District of Columbia and in interstate traffic. Definition of immunity unit for measuring strength of tetanus antitoxin as regards its action on a guinea pig receiving the official test dose of a standard toxin furnished by the Hygienic Laboratory.

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U. S. Gov., Treasury Dept. U. S. Public Health Service. Hygienic Laboratory Leaflet; 1922. Specifications for Diphtheria Toxin for Schick Test. Requirements on size of samples to be sent to Hygienic Laboratory, definition of minimal lethal dose, number of human doses per package, amount of toxin per human dose, volume of undiluted toxin, labelling of containers.

U. S. Gov., Treasury Dept. U. S. Public Health Service. Hygienic Lab. A–46; 1930. Minimum Requirements for Diphtheria Toxoid. Disallowance of use of horse meat, required size of dose, test for detoxification, minimum antigenic requirements, submission of protocols of preliminary toxicity, safety, and antigenic tests on each lot.

U. S. Gov., Treasury Dept. U. S. Public Health Service. Hygienic Lab. A–59; 1930. A Suggested Method for the Dilution of Scarlet Fever Streptococcus Toxin for the Dick Test and for Immunization. Methods of dilution described which will assist in prevention of deterioration for the extended dating period of 6 months.

U. S. Gov., Treasury Dept. U. S. Public Health Service. Hygienic Lab. E–10a, Rev.; 1927. Revised Minimum Requirements for Scarlet Fever Streptococcus Toxin for the Dick Test and for Immunization. Regulations regarding information to be supplied regarding source and specificity of organisms, examination for contamination, sterilization of toxic culture, reaction tests for each new batch of toxin as compared with control toxin supplied by Hygienic Laboratory, etc.

U. S. Gov., Treasury Dept. U. S. Public Health Service. Hygienic Lab. E–10c Rev.; 1927. Revised Minimum Requirements for Scarlet Fever Streptococcus Antitoxin. Requirements on labeling, test requirements against control toxin and also for comparative potency with control antitoxin distributed by Hygienic Laboratory.

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U. S. Gov., Treasury Dept. U. S. Public Health Service. Hygienic Lab. J-743. Undated. Minimum Requirements for Antimeningococcic and Antipneumococcic Serums. Requirements on maximum intensity and maximum turbidity, titre tests and protection tests of serums as compared to control serum supplied by Hygienic Lab., method of performing tests.

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U. S. Gov., Treasury Dept. U. S. Public Health Service. U. S. P. H. S. Decision No. 3, under Sec. 63 of the Regulations for the Sale of Viruses, Serums, Toxins, and Analogous Products. Gives the dates set, beyond which the above products can not be expected to yield their specific results, period of time after manufacture or issue stated for 21 types.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Diphtheria Antitoxin, Tetanus Antitoxin, Crude Tetanus Antitoxin. Physical properties, requirements as to source, permissible preservative and total solids, preparation only in Government licensed places, labeling and dating, strength according to standards of U. S. Public Health Service, dosage. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Smallpox Vaccine. Source, acidity or alkalinity requirements, preparation in Government licensed establishments only, preparation and examination, containers according to law and U. S. Public Health Service regulations, labeling and dating requirements. Recognized as standard in enforcement of Federal food and drugs act.

References.—Biological stains. *See* 803.19. Food and drugs act and regulations. *See* 810. Standard list of vaccines and antitoxins for ship medical supplies. *See* 915.50.

813. MEDICINAL OILS

813.1 CASTOR OIL

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Castor Oil. Description and properties, preparation and standard strengths of tincture, dilutions, and medications.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Castor Oil. Physical properties, test requirements for identity and purity, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

813.2 COD LIVER OIL

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Cod Liver Oil. Description and properties, source, preparation and standard strengths of triturations.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Cod Liver Oil. Physical properties, identity tests, test requirements for purity and for vitamine A potency, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

813.3 COTTONSEED OIL

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Cottonseed Oil. Physical properties, identity tests, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810. Cottonseed oil for other than medical purposes. *See* 142.4.

813.4 OIL OF ALMONDS

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Expressed Oil of Almond (Oil of Sweet Almond). Physical properties, identity tests, test requirements for purity, saponification and iodine values, dosage. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Oil of Bitter Almond. For medicinal and not for food flavoring purposes, physical properties, identity tests, test requirements for purity and for benzaldehyde and hydrocyanic acid content, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

813.5 LINSEED OIL

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Linseed Oil. Physical properties, identity tests, test requirements for purity, for use as a medicinal agent. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810. Linseed oil for paints. *See* 848.11, 848.12.

813.6 OLIVE OIL

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Olive Oil. Physical properties, identity tests, test requirements for purity, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810. Olive oil for food purposes. *See* 142.5.

813.7 SESAME OIL

American Pharmaceutical Assn. National Formulary; 1926. Sesame Oil. Description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810. Sesame oil for food purposes. *See* 142.8.

813.8 THEOBROMA OIL

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Oil of Theobroma (Cacao Butter), Physical properties, test requirements for identity and for purity. Recognized as a standard for medicinal purposes in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810. Cacao butter, food product. *See* 142.93.

813.9 MISCELLANEOUS MEDICINAL OILS

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Animal Oil, Oil of Cajaput, Oil of Santal, Petroleum, Oil of Turpentine. Descriptions and properties, preparation and standard strengths of tinctures, dilutions, medications, and triturations.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Croton Oil. Source and description, preparation and strength standards of triturations, tincture, dilutions, and medications for medicinal purposes.

American Pharmaceutical Assn. National Formulary; 1926. Oil of Bitter Orange, Oil of Orange Flowers, Oil of Bergamot, Rectified Oil of Birch Tar, Oil of Cardamom, Oil of Myrcia, Oil of Pimenta, Oil of Thyme. Descriptions and physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Chaulmoogra Oil. Tentative method of test for solubility in alcohol, determination of viscosity and determination of acid and iodine numbers of alcohol soluble portion using methods of U. S. Pharmacopoeia.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Oil of Chenopodium. Tentative method for determining amount of ascaridole.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Turpentine Oil (Spirits of Turpentine). Tentative method for determination of color, specific gravity, refractive index, distillation, mineral oil in turpentine.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Methyl Salicylate (Oil of Wintergreen, Oil of Sweet Birch, Oil of Teaberry). Physical properties, identity tests, test requirements for purity and for strength.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Oils of Anise, Orange, Cade, Cajaput, Caraway, Clove, Chaulmooga, Chenopodium, Cinnamon, Coriander, Eucalyptus, Fennel, Juniper, Lavender, Lemon, Peppermint, Spearmint, Myristica, Tar, Dwarf Pine Needles, Rosemary, Santal, Sassafras, Mustard, Turpentine, Croton Oil. For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

References.—Turpentine for commercial purposes. *See* 211.1. Food and drugs act and regulations. *See* 810. Creosote oil for medicinal purposes. *See* 801.3.

814. IODINE AND ARSENIC

814.1 IODINE

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Iodin. Description, physical and chemical properties, preparation and standard strengths of tincture, dilutions, and medications.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Iodine. Physical properties, identity tests, test requirements for purity and percentage of iodine, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Iodine for commercial uses. *See* 839.9. Food and drugs act and regulations. *See* 810.

814.2 ARSENIC

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Arsenious Oxid, Hydrogen Arsenid, Arsenious Iodid, Metallic Arsenic, Arsenious Sulphid, and Arsenic Disulphid. Description and properties, preparation and standard strengths of triturations, preparation and standard strengths of solutions of arsenious oxid and of hydrogen arsenid.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Arsenicals. Tentative method for determination of arsenic in iron-arsenic tablets, official methods for determining amount of arsenic in sodium cacodylate, in iron methylasenates, in arsphenamine and neoarsphenamine.

U. S. Gov., Treasury Dept. U. S. Public Health Service. Misc. Publ. No. 22; 1923 and Amendment No. 1 (1924). Regulations for the Control of the Manufacture, Importation and Sale of Arsphenamine. Mandatory in District of Columbia and in interstate traffic, test requirements on stability, solubility, arsenic content, and relative nontoxicity of product, forwarding of samples to Hygienic Laboratory, etc.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Arsenous Iodide, Arsenic Trioxide, Arsphenamine, Neoarsphenamine. For medicinal purposes, physical properties, test requirements for identity and purity, arsphenamine and neoarsphenamine in conformity with requirements of U. S. Public Health Service. Recognized as standards in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810. Arsenic insecticides. *See* 881.1. Determination of arsenic in foods. *See* 120. Arsenic trioxide, chemical reagent. *See* 839.9.

815. ANESTHETICS

815.1 ETHER

American Chemical Society, Journal of Industrial and Engineering Chemistry; July 15, 1929. Ether. A reagent for chemical analysis, requirements on specific gravity, permissible kinds and amounts of impurities, methods of test.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Ether. Physical properties, identity tests, test requirements for purity, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

815.2 CHLOROFORM

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Chloroform and Carbon Tetrachloride. For chloroform and chloroform mixtures, tentative methds for determining amount of chloroform.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Chloroform in Mixtures. Tentative method for determining amount of chloroform.

U. S. Pharmacopoeial Convention (Inc.) Pharmacopoeia of U. S. A.; 1926. Chloroform. Physical properties, identity tests, test requirements for purity, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

819. MISCELLANEOUS MEDICINAL AND PHARMACEUTICAL PREPARATIONS

819.1 POWDERS

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Lists several hundred drugs, mostly plant drugs, description of plant, part used for medicinal purposes, preparation and standard strengths of medicated powders and triturations.

American Pharmaceutical Assn. National Formulary; 1926. Powders. Aloe and Canella, Antimonial, Antiseptic, Aromatic, Rubefacient Spice, Aromatic Powder of Chalk, Aromatic Powder of Chalk and Opium, Mild Mercurous Chloride and Jalap, Compound Powder of Bayberry, Compound Pancreatin, Anisated Powder of Rhubarb and Magnesia, Compound Powder of Chalk. Ingredients and their proportions, dose.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Compound Chalk Powder, Powdered Extracts of Cascara Sagrada, of Colocynth, of Oxgall, of Rhubarb, Standard Powdered Pituitary. Composition, preparation, and dosage requirements. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Compound Effervescing Powder (Seidlitz Powder), Compound Powder of Glycyrrhiza (Comp. Licorice Powder), Mercury with Chalk (Gray Powder). Composition, preparation, physical properties, identity tests, test requirements for purity, dosage. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Compound Powder of Jalap, Compound Powder of Rhubarb (Gregory's Powder), Powder of Ipecac and Opium (Dover's Powder). Composition, preparation, physical properties, and dosage requirements. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Powdered Opium, Powdered Extracts of Belladonna, of Colchicum, of Hyoscyamus, of Nux Vomica, of Stramonium. Composition, preparation, test requirements for percentage of alkaloid, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Other alkaloids. *See* 811. Food and drugs act and regulations. *See* 810.

819.2 PREPARATIONS IN TUBES

819.3 IODUM-POTASSII

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Potassium Iodide. Physical properties, identity tests, test requirements for purity and for strength, dosage. For use as a medicinal agent and as a reagent for chemical analysis. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

819.4 MEDICINALS OF ANIMAL ORIGIN

American Pharmaceutical Assn. National Formulary; 1926. Extract of Beef. For medicinal purposes, description, tests for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Pepsin in Liquids. Tentative methods for preparation of sample and reagents, and for percentage of pepsin.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Oxgall. Physical properties, identity and purity tests. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Pancreatin. Source, physical properties, test requirements for purity, assay test requirements for starch digestive power and for casein digestive power, dosage. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Pepsin. Physical properties, identity tests, assay test requirements for proteolytic power, dosage. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Solution of Pituitary. Strength requirements, preparation of solution, test requirements for strength, preparation of standard powdered pituitary, dosage. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Thyroid. Thyroxin. Physical properties, identity tests, test requirements for purity and for percentage of iodine, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Biological medicinal agents. *See* 812. Cod liver oil. *See* 813.2. Food and drugs act and regulations. *See* 810.

819.9 DRUGS AND MEDICINALS NOT ELSEWHERE CLASSIFIED

American Drug Manufacturers Assn. Pharmaceutical Standards Including Tolerances and Methods of Analysis. Tolerances and methods of analysis for 26 compressed and 17 hypodermic tablets.

American Pharmaceutical Assn. National Formulary; 1926. Vanilla. As used in preparing tincture of vanilla for medicinal purposes, description and physical properties, tests for purity and identity. Recognized as standard in enforcement of Federal food and drugs act.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Barbital and Phenobarbital. Method of testing for purity, tentative test for melting point according to U. S. P. method.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Iodoform. Tentative method for determining percentage of iodoform.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Menthol. Tentative method for determining percentage of total menthol.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Drugs. Nitroglycerin. Methods for preparation of samples and reagents, and for percentage of nitroglycerin.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Hexamethylenetetramine in Tablets. Tentative Methods. Preparation of sample and reagent, determination of purity.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Pyramidon. Tests for identity and purity.

U. S. Gov., Treasury Dept. U. S. Public Health Service. Reprint No. 1027; 1925. Standardization of Pollen Extracts by the Complement Fixation Test. For ragweed pollen, method of preparation of extract, procedure for determining strength of an extract by complement fixation method, danger in use of the standard for other than relatively stable antigenic extracts.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. 630 Drugs and Medicinals. Physical properties, identity tests, test requirements for purity and in some materials tests for percentage of main or controlling ingredient, dosage. Recognized as standards in enforcement of Federal food and drugs act.

References.—Coal-tar products, as medicinals. *See* 803.2. Food and drugs act and regulations. *See* 810. Other chemicals in which some medicinal agents are included. *See* 820–839.

820–829 ACIDS (EXCEPT COAL-TAR) AND ANHYDRIDES, ALCOHOL, ETC.

820. GENERAL ITEMS

American Chemical Society. Vol. 12, Dec., 1920, and vol. 13, May, 1921, of Journal of Industrial and Engineering Chemistry. Committee Recommendation. Unit Weights for the Purchase of Reagents. Gives the unit weight in which reagent should be ordered and packaged.

821. ACIDS AND ANHYDRIDES

821.0 GENERAL ITEMS

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., C. P. No. 1, Rev. 1; 1929; and S. R. A., C. P. No. 2; 1928. Regulations for the Enforcement of the Caustic Poison Act. Regulations on labeling of dangerous caustic or corrosive substances used in household, includes providing the common name, the word poison, and an antidote, list of substances and their strengths covered by act, list of acceptable antidotes.

821.1 ACETIC ACID AND ANHYDRIDE

American Chemical Society, vol. 18. June and July, 1926, of Journal of Industrial and Engineering Chemistry. Acetic acid, glacial, acetic anhydride. Reagents for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Acetic Acid. Description and properties, preparation and standard strengths of solution, dilutions, and triturations for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Acetic Acid, Diluted Acetic Acid, Glacial Acetic Acid. As medicinal agents and as reagents for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Acetic Anhydride. Reagent for chemical tests, physical properties, identity tests, test requirements for purity and strength.

References.—Acidimetric standards (benzoic acid). *See* 802.1. Unit weights. *See* 820. Food and drugs act and regulations. *See* 810. Acetic acid as a laundry sour. *See* 871.25. Vinegar. *See* 154.70, 154.71.

821.2 BORIC ACID AND ANHYDRIDE

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Boric Acid. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis: 1930. Preservatives and Artificial Sweeteners. Boric Acid. Qualitative and quantitative test methods.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Boric Acid. As a medicinal, physical properties, identity tests, test requirements for purity and for strength, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Acidimetric standards (benzoic acid). *See* 802.1. Unit weights. *See* 820. Food and drugs act and regulations. *See* 810.

821.3 HYDROCHLORIC (MURIATIC) ACID

American Chemical Society, vol. 17, July, 1925, of Journal of Industrial and Engineering Chemistry. Hydrochloric Acid. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Hydrochloric Acid. Description and properties, preparation and standard strengths for solution, dilutions, for medicinal purposes.

Manufacturing Chemists Assn. of the U. S. Hydrochloric Acid; 1903. Tables of specific gravity, degrees Twadell, and per cent HCl for densities from 1 to 25.5 degrees Baumé, corrections for temperature.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Concentrated Hydrochloric Acid. As a reagent for chemical analysis, physical properties, test requirements for purity and strength.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Hydrochloric Acid and Diluted Hydrochloric Acid. As medicinal agents and as reagents for chemical analysis, physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

References.—Acidimetric standards (benzoic acid). *See* 802.1. Unit weights, labeling requirements. *See* 820, 821.0. Food and drugs act and regulations. *See* 810.

821.4 HYDROFLUORIC ACID

American Chemical Society, vol. 18, June and July, 1926, and corrected in vol. 19, May, 1927, of Journal of Industrial and Engineering Chemistry. Hydrofluoric Acid. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Hydrofluoric Acid. Description and properties, preparation and standard strengths of solution and dilutions for medicinal purposes.

References.—Acidimetric standards (benzoic acid). *See* 802.1. Unit weights, labeling requirements. *See* 820, 821.0. Food and drugs act and regulations. *See* 810.

821.5 NITRIC ACID

American Chemical Society, vol. 17, July, 1925, and correction in vol. 18, June and July, 1926, of Journal of Industrial and Engineering Chemistry. Nitric Acid. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Nitric Acid. Description and properties, preparation and standard strengths of solution and of dilutions for medicinal purposes.

Manufacturing Chemists Assn. of the U. S. Nitric Acid; 1926. Tables of specific gravity, density in degrees Twadell, and percentage of HNO_3, for densities of 10° to 48.50° B., corrections for temperature.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Nitric Acid. As a medicinal agent and also as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Acidimetric standards (benzoic acid). *See* 802.1. Unit weights, labeling requirements. *See* 820, 821.0. Food and drugs act and regulations. *See* 810.

821.6 OXALIC ACID

American Chemical Society. Journal of Industrial and Engineering Chemistry, vol. 17, July, 1925, and Analytical Edition of J. I. E. C., July 15, 1929, and April 15, 1931, editions. Recommended Specifications for Analytical Reagent Chemicals. Oxalic Acid. Permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Oxalic Acid. Description, properties, sources, preparation and standard strengths of triturations, tincture, dilutions and medications for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Oxalic Acid. Reagent for chemical analysis, physical properties, test requirements for purity, permissible ash.

References.—Oxalic acid as laundry sour. *See* 871.25. Acidimetric standards (benzoic acid). *See* 802.1. Unit weights. *See* 820. Food and drugs act and regulations. *See* 810.

821.7 SULPHURIC AND SULPHUROUS ACID

American Chemical Society, vol. 17, July, 1925, of Journal of Industrial and Engineering Chemistry. Sulphuric Acid. Reagent for chemical analysis, permissible impurities and amounts, strength, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Sulphuric Acid. Description and properties, preparation and standard strengths of solution and dilutions for medicinal purposes.

American Railway Assn. Signal Section. 4328; 1928. Electrolyte. Dilute sulphuric acid for storage batteries, allowable variation from specified specific gravity, allowable percentages of primary and secondary impurities.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Preservatives and Artificial Sweeteners. Sulfurous Acid. Qualitative test, determination of total sulfurous acid and of free sulphurous acid.

Manufacturing Chemists Assn. of the U. S. Sulphuric Acid; 1926. Tables of specific gravity, degrees Twadell, per cent acid, weight, per cent O. V., pounds O. V. in 1 cubic foot, and freezing point for densities from 0° to 66° B., approximate boiling points, corrections for temperature.

U. S. Gov., Dept. of Commerce, Bureau of Standards C19; 1924. Standard Density and Volumetric Tables. Includes tables of density of solutions of sulphuric acid.

U. S. Gov., Federal Specifications Board. W–B–131; 1930. Storage Batteries for Ignition, Lighting, and Starting. Includes sulphuric acid electrolyte, requirements on density, absence of color, permissible suspended matter, permissible chemical impurities and amounts.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Concentrated Sulphuric Acid. As a reagent for chemical analysis, physical properties, test requirements for identity and purity.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Sulphuric Acid and Diluted Sulphuric Acid. As medicinal agents and also as reagents for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Sulphurous Acid. Reagent for chemical analysis, physical properties, test requirements for purity and strength.

References.—Acidimetric standards (benzoic acid). *See* 802.1. Unit weights, labeling requirements. *See* 820, 821.0. Food and drugs act and regulations. *See* 810.

821.9 MISCELLANEOUS ACIDS AND ANHYDRIDES

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 20, Sept., 1928, and Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Citric Acid, Tartaric Acid. For each, permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 18, June and July, 1926, and Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Perchloric Acid, Phosphoric Acid. For each, permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, vol. 3, No. 2, Apr. 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Perchloric Acid, 60 Per Cent. Requirements on purity, permissible nonvolatile matter, chloride, nitrogen compounds, sulphate, ammonia, heavy metals, and iron, methods of test.

American Chemical Society, vol. 19, May, 1927, of Journal of Industrial and Engineering Chemistry. Molybdic Acid, 85 Per Cent, Molybdic Acid Anhydride. Reagents for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Chromic Acid, Hydrocyanic Acid, Nitrohydrochloric Acid, Phosphoric Acid. Description and properties, preparation and standard strengths of solutions and of dilutions, for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of of the U. S.; 1914. Citric Acid, Gallic Acid, Tannic Acid, Tartaric Acid. Descriptions and properties, preparation and standard strengths of triturations, tinctures, dilutions, and medications for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Formic Acid, Lactic Acid. Description and properties, preparation and standard strengths of solutions, dilutions, and medications, for medicinal purposes.

American Leather Chemists Assn. Methods of Sampling and Analysis; 1930. Lactic Acid. Provisional methods for determination of free sulfuric acid, volatile acid, and of free acid and anhydride.

American Pharmaceutical Assn. National Formulary; 1926. Bromauric Acid. Description and physical properties, test requirements for purity.

Recognized as standard in enforcement of Federal food and drugs act.

American Pharmaceutical Assn. National Formulary; 1926. Formic Acid. Description and physical properties, specific gravity and test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Preservatives and Artificial Sweeteners. Formic Acid. Preparation of reagents, description of apparatus, and method for quantitative determination of formic acid in sample.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Acetyltannic Acid, Citric Acid, Hypophosphorous Acid, Lactic Acid, Oleic Acid, Phosphoric Acid, Diluted Phosphoric Acid, Stearic Acid, Tannic Acid, Tartaric Acid, Trichloracetic Acid. For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Molybdic Acid, Phosphoric Acid, Phosphotungstic Acid, Tartaric Acid. Reagents for chemical analysis, description and physical properties, test requirements for purity.

References.—Coal-tar acids. *See* 802.1. Acidimetric standards (benzoic acid). *See* 802.1. Unit weights, labeling requirements. *See* 820, 821.0. Food and drugs act and regulations. *See* 810.

822. ALCOHOLS

822.0 GENERAL ITEMS

American Society for Testing Materials. Tentative Methods, D 268–31T; 1931. Method of Sampling and Testing Lacquer Solvents and Diluents. Applies to solvents and diluents for use in manufacture of nitrocellulose lacquer, method of sampling, methods of test for specific gravity, color, distillation, residue, nonvolatile matter, residual odor, water, acidity, alkalinity, ester value, copper corrosion, sulphur, dimethylketone, and potassium permanganate test.

U. S. Gov., Congress, section 3249, Revised Statutes. Defines proof spirits as alcoholic liquor which contains 50 per cent by volume of alcohol of given specific gravity. For definition of degrees proof see Gauger's Manual of Treasury Dept., 1913 edition.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulations 2; 1927. Relating to Permits as Provided in Title II, National Prohibition Act for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Covers regulations on permits to make, store, transport, purchase, export, import, administer and prescribe intoxicating liquors for nonbeverage purposes.

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulations No. 3; 1927, and Appendix of 1930. Industrial Alcohol and Denatured Alcohol. Includes laws and mandatory regulations on issuance of permits to industrial alcohol plants, bonded warehouses, denaturing plants, on payment of taxes, on manufacture of alcohol, on transportation and sale of alcohol, etc. Appendix contains formulas for denatured alcohols.

U. S. Gov., Treasury Dept. Internal Revenue. U. S. Internal Revenue Gaugers' Manual; 1913. Proof Spirit. Definition of proof spirit as regards percentage by volume of absolute alcohol and of water, definitions of 100 proof, 200 proof, etc.

822.1 AMYL ALCOHOL

American Chemical Society. vol. 18, June and July, 1926, of Journal of Industrial and Engineering Chemistry as corrected in July 15, 1929 issue. Amyl Alcohol. Reagent for chemical analysis, permissible kinds and amounts of impurities, methods of test.

American Society for Testing Materials. Tentative Specifications. D319–30T; 1930. Amyl Alcohol (Synthetic). Requirements on purity, specific gravity, color, distillation range, residue, odor, water, and acidity, methods of test as in A. S. T. M. Spec. D 268. For use with cellulose ester coatings.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Amyl Alcohol. Reagent for chemical analysis, physical properties, boiling point, specific gravity, permissible nonvolatile residue.

References.—Methods of testing. *See also* 822.0. Definitions, regulations on making and using alcohol. *See* 822.0.

822.2 BUTYL ALCOHOL

American Society for Testing Materials. Tentative Specifications, D 304–30T; 1930. Butanol (Normal Butyl Alcohol). For lacquer solvent or diluent, requirements for purity, specific gravity, color, distillation range, residue, odor, water, acidity, in accordance with A. S. T. M. test method D 268.

References.—Methods of testing. *See also* 822.0. Definitions, regulations on making and using alcohol. *See* 822.0.

822.3 ETHYL ALCOHOL, DENATURED

U. S. Gov., Treasury Dept. Bureau of Prohibition. Regulations No. 3; 1927, and Appendix of 1930. Industrial Alcohol and Denatured Alcohol. For specially denatured alcohols, appendix contains specifications for 70 formulas, requirements on percentages by volume of ethyl alcohol and other constituents, test requirements for physical or chemical properties of some of the constituents, lists of the preparations and manufactures in which the use of the specially denatured alcohols are permitted.

U. S. Gov., Treasury Dept., Bureau of Prohibition, Regulations No. 3; 1927, and Appendix of 1930. Industrial Alcohol and Denatured Alcohol. Appendix contains Formula No. 1 and No. 2 for completely denatured alcohol, including percentage requirements for ethyl alcohol, wood alcohol, and other constituents, physical property and chemical composition requirements of the various constituents.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Alcohol, Denatured. For use as a solvent in the manufacture of pharmacopoeial extracts and resins, but not remaining in the finished product, permissible addition of 5 to 10 per cent of methanol or of acetone to ethyl alcohol in order to make nonpotable.

References.—Ethyl alcohol, wood alcohol. *See* 822.4, 822.5. Methods of testing. *See also* 822.0. Definitions, regulations on making and using alcohol. *See* 822.0.

822.4 ETHYL ALCOHOL, PURE GRAIN.

American Chemical Society, vol. 20, Sept., 1928, of Journal of Industrial and Engineering Chemistry. Ethyl Alcohol. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Chemical Society, vol. 20, Sept., 1928, of Journal of Industrial and Engineering Chemistry. Ethyl Alcohol, Absolute. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Dispensing Alcohol. Requirements on percentage of ethyl alcohol, preparation, and tests for identity.

U. S. Gov., Dept. of Commerce, Bureau of Standards. C19; 1924. Standard Density and Volumetric Tables. Includes tables of density of mixtures of ethyl alcohol and water, specific gravity of such mixtures, and percentages of volume corresponding to various percentages of weight.

U. S. Gov., Treasury Dept., Bureau of Prohibition, Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Alcohol. Defined in regulations as ethyl alcohol or spirit of wine with proof of 160° or more and not including whiskey, brandy, rum, or gin.

U. S. Gov., Treasury Dept., Bureau of Prohibition, Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Medicated Alcohol. Gives 4 formulas by which medicated alcohol is permitted to be prepared by druggists and pharmacists.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Alcohol, Dehydrated (absolute) Alcohol, Diluted Alcohol. For medicinal purposes and also as reagents for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standards in enforcement of Federal food and drugs act.

References.—Denatured alcohol. *See* 822.3. Methods of testing. *See also* 822.0. Definitions, regulations on making and using alcohol. *See* 822.0. Food and drugs act and regulations. *See* 810.

822.5 METHYL OR WOOD ALCOHOL (METHANOL)

American Chemical Society, vol. 20, Sept., 1928, of Journal of Industrial and Engineering Chemistry as corrected in July 15, 1930, issue. Methanol. Reagent for chemical analysis, permissible kinds and amounts of impurities, methods of tests.

U. S. Gov., Dept. of Commerce, Bureau of Standards C19; 1924. Standard Density and Volumetric Tables. Includes tables of density and of specific gravity of mixtures of methyl alcohol and water, and percentages by volume corresponding to various percentages by weight.

U. S. Gov., Treasury Dept., Bureau of Prohibition, Regulations No. 3, 1927, and Appendix of 1930. Industrial Alcohol and Denatured Alcohol. Appendix contains specifications for wood alcohol for use in preparation of completely denatured alcohol, including manufacture, color, and specific gravity requirements, permissible acetone content and esters, required bromine absorption.

References.—Denatured alcohol. *See* 822.3. Methods of testing. *See also* 822.0. Definitions regulations on making and using alcohol. *See* 822.0.

822.9 MISCELLANEOUS ALCOHOLS

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Terpin Hydrate. A dihydric alcohol for medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

823. GLYCERINE

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Glycerin. Description, properties, specific gravity, tests for identifying material for use in homeopathic medicine.

U. S. Gov., Federal Specifications Board O–G–491; 1931. Glycerin (Glycerol). For 3 grades of which U. S. P. grade is to conform to specifications of U. S. Pharmacopoeia. For high gravity or dynamite glycerine and for yellow distilled, requirements on appearance, color, odor, specific gravity, acidity or alkalinity, ash, and chlorides, methods of sampling and testing.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Glycerin. For medical purposes, physical properties, identity tests, test requirements for purity, dosage. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

824. ALDEHYDE

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Formaldehyde Solutions. Official methods for determination of formaldehyde.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Preservative and Artificial Sweeteners. Formaldehyde. Preparation of sample, test methods for indicating presence of formaldehyde.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Benzaldehyde. For medical purposes, physical properties, test requirements for purity and strength, dosage. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Oil of Cinnamon containing 80 per cent of Cinnamic Aldehyde. For medical purposes, physical properties of the oil, identity tests, test requirements for purity, test requirements for content of cinnamic aldehyde, dosage. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Paraformaldehyde. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Paraldehyde (Paracetaldehyde). For medical purposes, physical properties, identity tests, test requirements for purity, dosage. Recognized as standard in enforcement of Federal food and durgs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Solution of Formaldehyde. For medical purposes, physical properties, identity tests, test requirements for purity and strength. Recognized as standard in enforcement of Federal food and drugs act.

References.—Preservatives and artificial sweeteners. *See also* 892. Insecticides. *See also* 881. Food and drugs act and regulations. *See* 810.

830–839 CHEMICAL COMPOUNDS (EXCEPT MEDICINALS, ACIDS, ALCOHOLS, AND COAL-TAR PRODUCTS)

830. GENERAL ITEMS

American Chemical Society, vol. 12, Dec., 1920, and vol. 13, May, 1921, of Journal of Industrial and Engineering Chemistry. Unit Weights for the Purchase of Reagents. Gives the unit weight in which the reagent should be ordered and packaged. A committee recommendation.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. S. R. A., C. P. No. 1, Rev. 1; 1929 and S. R. A., C. P. No. 2; 1928. Regulations for Enforcement of the Caustic Poison Act. Regulations on labeling of dangerous caustic or corrosive substances used in household, included providing the common name, the word poison, and an antidote, list of substances and their strengths covered by act, list of acceptable antidotes.

U. S. Gov., Dept. of Commerce, Bureau of Standards C19; 1924. Standard Density and Volumetric Tables. Includes tables of density and weight of water at various temperatures.

U. S. Gov., Dept. of Commerce, Bureau of Standards C35; 1919. Melting Points of Chemical Elements, and Other Standard Temperatures. Table of melting points of elements and boiling points of some liquids, with the values indicated which are used by the bureau as standard temperatures for calibration of thermometers and pyrometers.

U. S. Gov., Treasury Dept., Bureau of Prohibition, Regulations No. 3; 1927, and Appendix of 1930. Industrial Alcohol and Denatured Alcohol. Appendix contains formulae for 70 specially denatured alcohols, requirements on percentages by volume of alcohol and other constituents, test requirements for physical or chemical properties of some of the constituents, lists of the preparations and manufactures in which the use of the specially denatured alcohols are permitted.

831. AMMONIUM AND AMMONIUM COMPOUNDS

831.1 ANHYDROUS AND AQUA AMMONIA

American Chemical Society, vol. 17, July, 1925, of Journal of Industrial and Engineering Chemistry. Ammonium Hydroxide. Chemical reagent, permissible impurities and amounts, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Ammonium Hydrate. Description and properties, preparation and standard strength of solution and of dilutions for medicinal purposes.

Manufacturing Chemists Assn. of the U. S. Aqua Ammonia; 1903. Tables of specific gravity and per cent NH_3 for densities from 10° to 29° B., corrections for temperature.

U. S. Gov., Dept. of Commerce, Bureau of Standards LC124; 1924. Recommended Specification for Powdered Ammonia. For a mixture of sodium carbonate and ammonium salts in powdered form, requirements on percentage of ammonia, alkalinity, permissible insoluble matter and free alkali, methods of inspection and test.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Aqua Ammonia. Physical properties, identity tests, test requirements for purity and strength. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810.

831.2 BICHROMATE, AMMONIUM

831.3 CARBONATE AND BICARBONATE, AMMONIUM

American Chemical Society, vol. 18, June and July, 1926, of Journal of Industrial and Engineering Chemistry as corrected in July, 1930, issue. Ammonium Carbonate. Reagent for chemical analysis, permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Ammonium Carbonate. Description and properties, preparation and standard strengths of solution and of dilutions for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Ammonium Carbonate. Reagent for chemical analysis, physical properties, identity tests, test requirements for purity and strength.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of the U. S. A.; 1926. Ammonium Carbonate. Physical properties, identity test and test requirements for purity and strength. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810.

831.4 CHLORIDE, AMMONIUM

American Chemical Society, vol. 18, June and July, 1926, and vol. 20, Sept., 1928, of Journal of Industrial and Engineering Chemistry. Ammonium Chloride. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Ammonium Chlorid. Description and properties, preparation and standard strengths of solutions, dilutions, medications, and triturations for medicinal purposes.

U. S. Gov., Federal Specifications Board O–A–491; 1930. Ammonium Chloride (Sal Ammoniac). Grade for battery purposes, grade B for galvanizing purposes, requirements on percentage of ammonium chloride and screen grading for each grade, heavy metal test for grade A, using test methods of U. S. Pharmacopoeia.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopeia of U. S. A.; 1926. Ammonium Chloride. Reagent for chemical analysis, physical properties, identity tests, tests for purity and for strength.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Ammonium Chloride. Physical properties, identity tests, tests for purity and strength. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810.

831.5 NITRATE, AMMONIUM

American Chemical Society, vol. 19, May, 1927, of Journal of Industrial and Engineering Chemistry as corrected in July 15, 1930, issue. Ammonium Nitrate. Reagent for chemical analysis, permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Ammonium Nitrate. Description and properties, preparation and standard strengths of solution, dilutions, medications, and triturations for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Ammonium Nitrate. Reagent for chemical analysis, physical properties, test requirements for purity.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810.

831.6 PHOSPHATE, AMMONIUM

American Chemical Society. Journal of Industrial and Engineering Chemistry, vol. 19, May, 1927, and Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Ammonium Phosphate, Dibasic. Permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Ammonium Phosphate. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

American Pharmaceutical Assn. National Formulary; 1926. Ammonium Phosphate. Description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810.

831.7 SULPHATE AND PERSULPHATE, AMMONIUM

American Chemical Society, vol. 18, June and July, 1926, and vol. 20, Sept., 1928, of Journal of Industrial and Engineering Chemistry. Ammonium Sulphate. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Chemical Society, vol. 18, June and July, 1926, of Journal of Industrial and Engineering Chemistry. Ammonium and Potassium Sulphate, Ammonium Persulfate, Ferric Ammonium Sulphate, Ferrous Ammonium Sulfate. Reagents for chemical analysis, permissible impurities and amounts, test requirements and procedure.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Ammonium Sulphate. Reagent for chemical analysis, appearance, permissible ash, test requirements for quality.

References.—Unit weights. *See* 830.

831.9 MISCELLANEOUS AMMONIUM COMPOUNDS

American Chemical Society, vol. 18, June and July, 1926, of Journal of Industrial and Engineering Chemistry. Ammonium Acetate. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 17, July, 1925. Recommended Specifications for Analytical Reagent Chemicals. Ammonium Oxalate. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 17, July, 1925, and vol. 3, No. 2, April 15, 1931, of Analytical Edition of J. I. E. C. Recommended Specifications for Analytical Reagent Chemicals. Ammonium Thiocyanate. Permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Ammonium Acetate. Description, preparation and standard strength of solution for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Ammonium Benzoate, Ammonium Bromid, Ammonium Iodid, Ammonium Picrate, and Ammonium Valerianate. Descriptions and properties, preparation and standard strengths of triturations for medicinal purposes.

American Pharmaceutical Assn. National Formulary; 1926. Ammonium Hypophosphite. Ammonium Valerate. Descriptions and physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 43. To Make Ammonium Acetate. Required amounts of ammonia and of acetic acid, strength specified for each, method of preparation.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Ammonium Benzoate, Ammonium Bromide, Ammonium Salicylate. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A. Ammonium Molybdate Test Solution. For chemical analysis, preparation, test for deterioration.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Ammonium Oxalate. Reagent for chemical analysis, appearance, permissible ash, test requirements for purity.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Ammonium Sulphide Test Solution. For chemical analysis, preparation, permissible ash, test requirements for purity.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810.

832. POTASSIUM AND POTASSIUM COMPOUNDS

832.1 CYANIDE OF POTASSIUM

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Potassium Cyanid. Description and properties, maximum dose, preparation and standard strengths of triturations for medicinal purposes.

References.—Unit weights, labeling of poisons. *See* 830.

832.2 CARBONATE OF POTASH.

American Chemical Society. Journal of Industrial and Engineering Chemistry, vol. 18, June and July, 1926, and vol. 3 of Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Potassium Carbonate, anhydrous. Permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Potassium Carbonate. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Potassium Carbonate. As a medicinal agent and also as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810.

832.3 CRUDE POTASH AND CAUSTIC POTASH (HYDROXIDE)

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 17, July, 1925, vol. 18, June and July, 1926, and vol. 3 of Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Potassium Hydroxide. Permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Potassium Hydrate. Description and properties, preparation and standard strengths of solution, dilutions, and medications for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Potassium Hydroxide (Caustic Potash). As a medicinal agent and as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights, labeling of poisons. *See* 830. Food and drugs act and regulations. *See* 810.

832.4 POTASH SALTS

American Chemical Society, vol. 18, June and July, 1926, of Journal of Industrial and Engineering Chemistry. Ammonium and Potassium Sulfate. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, July 15, 1929, and April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Potassium and Sodium Tartrate. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 19, May, 1927, and vol. 3 of Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Potassium Bromate, Potassium Bromide, Potassium Iodate, Potassium Iodide, Potassium Phosphate. For each, permissible kinds and amounts of impurities, methods of test.

American Chemical Society, vol. 19, May, 1927, of Journal of Industrial and Engineering Chemistry as corrected in July 15, 1930, issue. Potassium Chlorate. Reagent for chemical analysis, permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 18, June and July, 1926, and vol. 3 of Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Potassium Chloride, Potassium Permanganate. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry. July 15, 1929. Potassium Chromate. A reagent for chemical analysis, permissible kinds and amounts of impurities, and methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 17, July, 1925, and Analytical Edition of J. I. E. C., July 15, 1929, and Apr. 15, 1931, editions. Recommended Specifications for Analytical Reagent Chemicals. Potassium Dichromate. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 20, Sept., 1928, and vol. 3 of Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Potassium Ferricyanide and Potassium Ferrocyanide. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society, vol. 18, June and July, 1926, of Journal of Industrial and Engineering Chemistry. Potassium Sulfate. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Potassium Acetate, Potassium Permanganate. Description and properties, preparation and standard strengths of solutions and dilutions for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Potassium Arsenite. Description and properties, preparation and standard strengths of solution, dilutions, and medications for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Potassium Bromid, Potassium Chlorate. Descriptions and properties, preparation and standard strengths of triturations, solutions, dilutions, and medications for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Potassium Chromate, Ferrocyanid, Chloride, Nitrate, Oxalate, Phosphate, Picrate, Sulfate, Tartrate. Descriptions and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Potassium Iodid. Description and properties, preparation and standard strengths of triturations, tincture, dilutions, and medications for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Potassium Dichromate, Potassium Hypophosphite. Descriptions and properties, preparation and standard strengths of triturations, solutions, and dilutions for medicinal purposes.

American Pharmaceutical Assn. National Formulary; 1926. Potassium Chloride, Potassium Hypophosphite, Potassium Sulphate. Descriptions and physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Definitions of terms for Fertilizers and Liming Materials. Muriate of Potash (Commercial Potassium Chloride). Required percentage of potash (K_2O), chiefly as chloride.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Definitions of terms for Fertilizers and Liming Materials. Nitrate of Potash (Commercial Potassium Nitrate). Required percentage of potash (K_2O).

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Definitions of terms for Fertilizers and Liming Materials. Sulphate of Potash (Commercial Potassium Sulphate). Required percentage of potash and permissible content of chlorine.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Definitions of terms for Fertilizers and Liming Materials. Sulphate of Potash-Magnesia. Required content of potash and of sulphate of magnesia, permissible content of chlorine.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Acid potassium phthalate. Sample No. 84 prepared and sold by the bureau for use in industry and by others as a standard in acidimetry, preparation of standard solutions, etc.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Potassium Bromate, Chloride, Chromate, Dichromate, Ferricyanide, Ferrocyanide, Sulphate, Thiocyanate, Reagents for chemical analysis, physical properties, test requirements for identity and purity.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Potassium Bromide. For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Potassium and Sodium Tartrate, Potassium Acetate, Potassium Bicarbonate, Bitartrate, Chlorate, Citrate, Iodide, Nitrate, Permanganate. As medicinal agents and as reagents for chemical analysis, physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

References.—Unit weights, labeling of poisons. *See* 830. Food and drugs act and regulations. *See* 810

833. CALCIUM AND CALCIUM COMPOUNDS, INCLUDING LIME

833.1 CALCIUM CARBIDE

U. S. Gov., Federal Specifications Board O–C–101; 1930. Calcium Carbide. For production of acetylene gas, requirements on general quality, yield and quality of acetylene gas per pound of carbide, screen grading for 4 size grades, methods of test for gas yield and for phosphine in gas, shipment in drums.

833.2 CALCIUM CHLORIDE

American Chemical Society, vol. 20, Sept., 1928, of Journal of Industrial and Engineering Chemistry. Calcium Chloride, Anhydrous. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, July 15, 1930, and April 15, 1931, editions. Recommended Specifications for Analytical Reagent Chemicals. Calcium Chloride, $CaCl_2 \cdot 2H_2O$. Requirements on content of calcium chloride, alkalinity, acidity, permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Calcium Chlorid. Description and properties, preparation and standard strengths of solution, dilutions, and medications for medicinal purposes.

American Society for Testing Materials. Tentative Specifications D 98–30T; 1930. Calcium Chloride for Dust Prevention. For use on highways, screen analysis and chemical composition requirements.

American Water Works Assn. Water Works Practice Manual; 1925. Chemicals Used in Water Purification. Chloride of Lime. Requirements on percentage of available chlorine.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Calcium Chloride. As a medicinal agent and also as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Chloride of lime bleach. *See* 891. Unit Weights. *See* 830. Food and drugs act and regulations. *See* 810.

833.3 CALCIUM CARBONATE

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, July 15, 1930, and April 15, 1931, editions. Recommended Specifications for Analytical Reagent Chemicals. Calcium Carbonate. Requirements on alkalinity, permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, July 15, 1930, and April 15, 1931, editions. Recommended Specifications for Analytical Reagent Chemicals. Calcium Carbonate, Low in Alkalies. Permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Calcium Carbonate of Hahnemann. Preparation and standard strengths of triturations for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Calcium Carbonate. As a medicinal agent and also as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810. Chalk, ceramic whiting. *See* 546. Limestone. *See* 511.2.

833.4 CALCIUM PHOSPHIDE

833.5 CAUSTIC (QUICKLIME) AND HYDRATED LIME

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Calcium Hydrate. Description and properties, preparation and standard strengths of solutions and dilutions for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Solution of Calcium Hydroxide. As a medicinal agent and as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810. Quicklime and hydrated lime for water treatment. *See* 882.2. Quicklime and hydrated lime for various other purposes. *See* 517.2.

833.9 MISCELLANEOUS CALCIUM COMPOUNDS

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Calcium Acetate of Hahnemann. Preparation and standard strengths of solution, dilutions, and medications for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Calcium Arsenate, Bromid, Fluorid, Hypophosphite, Iodid, Oxalate, Phosphate, Sulphate. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

American Pharmaceutical Assn. National Formulary; 1926. Calcium Hypophosphite, Calcium Lactophosphate, Precipitated Calcium Phosphate. Descriptions and physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Calcium Cyanide. Methods for determination of cyanogen and chlorine.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl., 1927. Standard Samples. Calcium molybdate. Sample No. 71 prepared and sold by the bureau with a certificate giving the percentage of Mo, Fe, and Ti, for use by industrial organizations and others as a comparison standard for checking the accuracy of analysis of similar material.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Calcium Bromide, Clycerophosphate, Calcium Iodobehenate, Calcium Lactate. For medicinal purposes, descriptions and physical properties, test requirements for identity and for purity. Recognized as standards in enforcement of Federal food and drugs act.

Refcrenees.—Unit weights, labeling of poisons. *See* 830. Food and drugs act and regulations. *See* 810. Calcium fertilizers. *See* 850–859. Calcium arsenate and insecticides. *See* 881.12. Gypsum, calcined gypsum. *See* 514.1. 514.2.

834. SODIUM AND SODIUM COMPOUNDS

834.1 SODIUM CYANIDE

American Chemical Society, vol. 18, June and July, 1926, of Journal of Industrial and Engineering Chemistry. Sodium Cyanide. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Sodium and Potassium Cyanides. Official methods for determination of cyanogen and chlorine.

U. S. Gov., Federal Specifications Board O–S–591; 1930. Sodium Cyanide. For use as an insecticide in fumigation, requirement on content of sodium cyanide, chlorides, freedom from iron and detrimental impurities, methods of analysis as specified by Assn. of Official Agricultural Chemists.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Sodium Cyanide. Reagent for chemical analysis, physical properties, test requirements for purity and strength.

References.—Unit weights, labeling of poisons. *See* 830.

834.2 SODIUM NITRATE

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 19, May, 1927, and vol. 3 of Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Sodium Nitrate. Permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Sodium Nitrate. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Definitions of terms for Fertilizers and Liming Materials. Nitrate of Soda (Commercial Sodium Nitrate). Required percentage of nitrogen, chiefly as sodium nitrate.

References.—Unit weights. *See* 830.

834.3 SODIUM BORATE (BORAX)

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Sodium Pyroborate (Borax). Description and properties, preparation and standard strengths of triturations for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Sodium Borate. As a medicinal agent and also as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810.

834.4 SODIUM CARBONATE, SODA ASH

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 18, June and July, 1926, and vol. 3 of Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Sodium Carbonate, anhydrous. Permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Sodium Carbonate. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Soda Ash to Be Used in Water Treatment; 1922. For light soda ash, sampling, minimum percentage of sodium carbonate, fineness requirement.

American Water Works Assn. Water Works Practice Manual; 1925. Chemicals Used in Water Purification. Soda Ash. For 58 per cent light soda ash, requirements on content of sodium carbonate, freedom from chips and foreign matter.

Laundryowners National Assn. Laundry Supplies. Undated. Soda Ash. A 58 per cent soda ash grade is the standard.

U. S. Gov., Federal Specifications Board O–S–571; 1930. Soda Ash. For anhydrous sodium carbonate in powdered form in 2 types, 58 per cent ordinary, and 58 per cent dense, not applicable to soda ash used in glass making, requirements on alkalinity, volume, permissible hydroxide, bicarbonate, insoluble matter, sulphur, and loss on heating, methods of testing.

U. S. Gov., Federal Specifications Board O–S–581; 1930. Granular Sodium Carbonate. Monohydrate crystals suitable for photographic purposes, requirements on total alkalinity, absence of hydroxide and bicarbonate, permissible matter insoluble in water, methods of sampling and test.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Monohydrated Sodium Carbonate. As a medicinal agent and also as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Sodium Carbonate, Anhydrous. Reagent for chemical analysis, physical properties, test requirements for identity and for purity.

References.—Soda ash for boiler compound. *See* 882.2. Laundry soda. *See* 834.7. Unit weights. *See* 830. Food and drugs act and regulations. *See* 810.

834.5 SODIUM BICARBONATE

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 18, June and July, 1926, and vol. 3 of Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Sodium Bicarbonate. Permissible kinds and amounts of impurities, methods of test.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Sodium Bicarbonate. As a medicinal agent and also as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Baking soda, laundry soda. *See* 155.2, 834.7. Unit weights. *See* 830. Food and drugs act and regulations. *See* 810.

834.6 SODIUM SILICATE (WATER GLASS)

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circulars No. 6

and No. 11; 1923. Solid Fiber and Plyboard Boxes for Boots and Shoes, and Corrugated Strawboard Boxes for Boots and Shoes. Includes silicate of soda used in construction of boxes, requirements on composition and specific gravity.

834.7 HYDRATED OR SAL SODA (WASHING SODA)

U. S. Gov., Federal Specifications Board P–S–641; 1930. Laundry Soda (Washing Soda). For powder composed of sodium carbonate and bicarbonate, requirements on alkalinity, matter insoluble in water, methods of sampling and testing.

834.8 CAUSTIC SODA OR LYE

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 17, July, 1925, vol. 18, June and July, 1926, and vol. 3 of Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Sodium Hydroxide. Permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Sodium Hydrate. Description and properties, preparation and standard strengths of solution, dilutions, and medications for medicinal purposes.

American Water Works Assn. Water Works Practice Manual; 1925. Chemicals Used in Water Purification. Caustic Soda. For 76 per cent test sodium oxide, solid, ground, and flake, requirements on content of sodium hydroxide.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Soda Lye. Official methods for determination of carbonate and of hydroxide.

U. S. Gov., Federal Specifications Board P–S–631; 1930. Caustic Soda (Lye). In flake, powdered or granular form, for cleaning purposes, requirements on percentage of sodium hydroxide and of carbonate, methods of test.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Sodium Hydroxide. As a medicinal agent and also as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights, labeling of poisons. *See* 832. Food and drugs act and regulations. *See* 810.

834.9 MISCELLANEOUS SODIUM COMPOUNDS

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, July 15, 1929, and April 15, 1931, editions. Recommended Specifications for Analytical Reagent Chemicals. Potassium and Sodium Tartrate. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 19, May, 1927, and Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Sodium Acetate. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society, vol. 20. Sept., 1928. of Journal of Industrial and Engineering Chemistry. Sodium Chloride, Sodium Bisulphate, fused ($NaHSO_4$). Reagents for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Chemical Society, Journal of Industrial and Engineering Chemistry. July 15, 1930. Sodium Metal. Reagent for chemical analysis, permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, vol. 3, No. 2, Apr. 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Sodium Nitroferricyanide. Permissible insoluble matter, chloride, and sulphate, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 17, July, 1925, and vol. 3 of Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Sodium Oxalate. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 19, May, 1927, and vol. 3 of Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Sodium Peroxide, Sodium Phosphate. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society, vol. 18, June and July, 1926, of Journal of Industrial and Engineering Chemistry. Sodium Sulphate, anhydrous. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Chemical Society, vol. 19, May, 1927, of Journal of Industrial and Engineering Chemistry. Sodium Bismuthate as corrected in same vol., Sodium Sulphite. Reagents for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 18, June and July, 1926, and Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Sodium Thiosulfate. Permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Sodium Arsenate, Bromid, Hypophosphite, Phosphate, Salicylate, Sulpho-Carbolate, Sulphate, Sulphite. Descriptions and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Sodium Chlorid. Description and properties, preparation and standard strengths of triturations, solution, dilutions, and medications for medicinal purposes.

American Pharmaceutical Assn. National Formulary; 1926. Sodium Arsenate, Exsiccated Sodium Arsenate, Sodium Glycerophosphate, Sodium Hypophosphite, Sodium Perborate. Descriptions and physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930 Waters, Brine, and Salt. Brine, Tentative Methods. Determination of iodine in presence of chlorine and bromine, of bromine in presence of chlorine but not iodine, and of bromine in presence of chlorine and iodine.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930 Waters, Brine, and Salt. Salt. Tentative methods for determination of moisture, matters insoluble in water, sulphate, calcium, and magnesium.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Sodium oxalate. Sample No. 40b prepared and sold by the bureau, for use in industry and by others as an oxidimetric standard, but may be used for acidimetry. For use as a standard in volumetric analysis see also Bur. of Standards Circ. No. 40. The use of sample No. 40c (which is to replace 40b) as a standard in volumetric analysis is described in B. S. Circ. No. 381.

U. S. Gov., Dept. of Commerce, Bureau of Standards C381; 1930. Sodium Oxalate as a Standard in Volumetric Analysis. Describes the preparation of sodium oxalate as a primary volumetric standard, tests for impurities, stability, recommended procedure for use in oxidimetry.

U. S. Gov., Federal Specifications Board 558; 1928. Trisodium Phosphate, Technical (Phosphate Cleaner). Granulated product used for cleaning typewriter parts, floors, metals, etc., where abrasive action is not desired, requirements on alkalinity, percentage of phosphoric anhydride, insoluble matter, and sieve grading, methods of sampling and test.

U. S. Gov., Federal Specifications Board O-S-601; 1930. Sodium Fluoride, Insecticide. A powder suitable for dusting, requirements on general physical quality, content of sodium fluoride, permissible impurities, methods of sampling and test.

U. S. Gov., Federal Specifications Board O-S-606; 1930. Anhydrous Sodium Sulphite for Photography. Requirements on solubility, permissible insoluble matter, permissible sodium carbonate content, heavy metal content, iron content, percentage of pure material, methods of sampling and test.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Sodium Acetate, Bromide, Chloride, Nitrite, Phosphate, Thiosulphate. As medicinal agents and as reagents for chemical analysis, physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Sodium Benzoate, Biphosphate, Cacodylate, Citrate, Indigotindisulphonate, Iodide, Salicylate, Sulphate. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Sodium Bisulphite, Bitartrate, Tartrate, Oxalate, Sulphide. Reagents for chemical analysis, physical properties, test requirements for purity.

References.—Table salt and dairy salt. *See also* 154.6. Bisulphite bleach. *See also* 891. Unit weights, labeling of poisons. *See* 830. Food and drugs act and regulations. *See* 810. Test for arsenic in sodium cacodylate. *See* 814.2.

835. BARIUM COMPOUNDS

835.1 BARIUM CARBONATE

American Chemical Society, Journal of Industrial and Engineering Chemistry, vol. 19, May, 1927, and Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Barium Carbonate. Permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Barium Carbonate. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

References.—Unit weights. *See* 830.

835.2 BARIUM CHLORIDE

American Chemical Society, vol. 17, 1925, July, 1925, of Journal of Industrial and Engineering Chemistry. Barium Chloride. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Barium Chlorid. Description and properties, preparation and standard strengths of solution, dilutions, medications, and triturations for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Barium Chloride. Reagent for chemical analysis, physical properties, test requirements for purity.

References.—Unit weights. *See* 830.

835.3 BARIUM DIOXIDE

835.4 BARIUM HYDROXIDE

American Chemical Society, vol. 19, May, 1927, of Journal of Industrial and Engineering Chemistry as corrected in July 15, 1929, issue. Barium Hydroxide. Reagent for chemical analysis, permissible impurities and amounts, test procedure.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Barium Hydroxide. Reagent for chemical analysis, physical properties, test requirements for purity and for strength.

References.—Unit weights. *See* 830.

835.5 BARIUM NITRATE

American Chemical Society, vol. 19, May, 1927, of Journal of Industrial and Engineering Chemistry. Barium Nitrate. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Barium Nitrate. Reagent for chemical analysis, physical properties, test requirements for purity.

References.—Unit weights. *See* 830.

835.6 BARIUM SULPHIDE

835.7 BARIUM IODIDE

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Barium Iodid. Description and properties, preparation and standard strengths of tincture, dilutions, medications, and triturations.

835.8 BARIUM ACETATE

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Barium Acetate. Description and properties, preparation and standard strengths of solutions, dilutions, medications, and triturations for medicinal purposes.

835.9 MISCELLANEOUS BARIUM COMPOUNDS

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Barium Sulphate. For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Barium sulphate paint pigments. *See* 842.86, 842.87. Food and drugs act and regulations. *See* 810.

836. BISMUTH COMPOUNDS

836.1 BISMUTH CHLORIDE

836.2 BISMUTH NITRATE

836.3 BISMUTH SUBNITRATE

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Bismuth

Subnitrate. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Bismuth Subnitrate. For medicinal purposes, description and physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

836.9 MISCELLANEOUS BISMUTH COMPOUNDS

American Chemical Society, vol. 19, May, 1927, and corrections in same vol. of Journal of Industrial and Engineering Chemistry. Sodium Bismuthate. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Bismuthous Oxid. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Bismuth Subcarbonate, Bismuth Subgallate, Bismuth Subsalicylate. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standards in enforcement of Federal food and drugs act.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810.

837. CHROMIUM AND MOLYBDENUM COMPOUNDS

837.1 CHROMIUM POTASSIUM SULPHATE

837.2 CHROMIUM TRIOXIDE

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, vol. 3, No. 2, Apr. 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Chromium Trioxide. Requirements on purity, permissible insoluble matter, chloride, sulfate, alkali salts, iron, aluminum, barium, etc., methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Chromium Trioxide (Chromic Acid). Description and properties, preparation and standard strengths of solution and of dilutions for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of the U. S. A.; 1926. Chromium Trioxide. As a medicinal agent and also as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights, labeling of poisons. *See* 830. Food and drugs act and regulations. *See* 810.

837.3 MOLYBDIC OXIDE

837.9 MISCELLANEOUS CHROMIUM AND MOLYBDENUM COMPOUNDS

American Chemical Society. Journal of Industrial and Engineering Chemistry. July 15, 1929. Potassium Chromate. Reagent for chemical analysis, permissible kinds and amounts of impurities, and methods of test.

American Chemical Society, vol. 17, July, 1925, of Journal of Industrial and Engineering Chemistry as corrected in July 15, 1929, issue. Potassium Dichromate. Reagent for chemical analysis, permissible impurities and amounts, test procedure.

American Chemical Society, vol. 19. May, 1927, of Journal of Industrial and Engineering Chemistry. Molybdic Acid, 85 per cent, Molybdic Acid Anhydride. Reagents for chemical analysis, permissible impurities and amounts, test requirements and procedure.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Molybdic Acid. Reagent for chemical analysis, description and physical properties, test requirements for purity.

References.—Unit weights. *See* 830.

838. ALUMINUM COMPOUNDS

838.1 ALUMINUM HYDROXIDE (REFINED BAUXITE)

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Aluminum Hydrate. Preparation of crude product, description and properties, preparation and standard strengths of triturations for medicinal purposes.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Bauxite. Sample No. 69 prepared and sold by the bureau with a certificate giving a complete analysis, for use by industrial organizations and others as a comparison standard for checking the accuracy of analysis of similar material, etc.

838.2 ALUMINUM POTASSIUM SULPHATE (ALUM)

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Alum (Aluminum and Potassium Sulphate). Description and properties, preparation and standard strengths of triturations and solution for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Alum, and Exsiccated Alum. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standards in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

838.3 ALUMINUM SULPHATE

American Pharmaceutical Assn. National Formulary; 1926. Aluminum Sulphate. Description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Sulphate of Alumina to be Used in Water Treatment; 1922. For basic sulphate of alumina, sampling and chemical composition requirements.

American Water Works Assn. Water Works Practice Manual; 1925. Chemicals Used in Water Purification. Sulphate of Alumina. Requirements on percentage of water-soluble alumina, permissible iron and insoluble matter, size of lumps or grain.

References.—Food and drugs act and regulations. *See* 810.

838.4 ALUMINUM AMMONIUM SULPHATE

838.5 ALUMINUM CHLORIDE

American Pharmaceutical Assn. National Formulary; 1926. Aluminum Chloride. Description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

838.6 ALUMINUM OXIDE

References.—Aluminum oxide abrasives. *See* 541.0, 541.3, 541.4.

838.7 ALUMINUM FLUORIDE

838.9 MISCELLANEOUS ALUMINUM COMPOUNDS

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Metallic Aluminum. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

References.—Aluminum bronze paint and powder. *See* 847.1.

839. CHEMICALS AND CHEMICAL COMPOUNDS NOT ELSEWHERE CLASSIFIED

839.1 ACETONE

American Chemical Society, vol. 18, June and July, 1926, of Journal of Industrial and Engineering Chemistry. Acetone. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Society for Testing Materials. Tentative Specifications. D 329–31T; 1931. Acetone. Requirements on purity, specific gravity, color, distillation range, permissible nonvolatile matter, water, acidity, water solubility, alkalinity, potassium permanganate test, using test method D 268–30T of A. S. T. M. for testing lacquer solvents and diluents.

U. S. Gov., Federal Specifications Board O–A–51; 1931. Acetone. For 2 grades, requirements on color, miscibility with water, specific gravity, distillation, residue after evaporation, acidity, alkalinity, and purity, methods of sampling and test.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Acetone. As a medicinal agent and as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810. Testing of lacquer solvents and diluents. *See* 822.0.

839.2 AMYL ACETATE

American Society for Testing Materials. Tentative Specifications D318–30T; 1930. Amyl Acetate (Synthetic). Requirements on specific gravity, color, distillation range, residue, odor, water, acidity, and ester value, using A. S. T. M. methods of test D 268. For use with cellulose ester coatings.

References.—Methods of testing lacquer solvents and diluents. *See* 822.0.

839.3 COMPOUNDS, MIXTURES, AND SALTS OF METALS

839.31 Antimony Compounds and Salts

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Antimonious Arsenate, Sulphid, Iodid, Oxid, Sulphid (yellow). Descriptions and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Tartar Emetic (Potassium Antimonyl Tartrate). Description and properties, preparation and standard strengths of triturations for medicinal purposes.

American Parmaceutical Assn. National Formulary; 1926. Antimony Oxide. Description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Antimony and Potassium Tartrate. Description and physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

839.32 Cobalt Compounds and Salts

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Metallic Cobalt. Description and properties, preparation and standard strengths of triturations for medicinal use.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Cobaltous Chloride. Reagent for chemical analysis, physical properties, test requirements for purity.

References.—Unit weights. *See* 830.

839.33 Copper Compounds and Salts

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, July 15, 1929, and April 15, 1931, editions. Recommended Specifications for Analytical Reagent Chemicals. Cupric Ammonium Chloride. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, July 15, 1929, and April 15, 1931, editions. Recommended Specifications for Analytical Reagent Chemicals. Cupric Oxide, Powdered and Granular. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, July 15, 1930, and April 15, 1931, editions. Recommended Specifications for Analytical Reagent Chemicals. Cupric Oxide, Wire Form. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society, vol. 19, May, 1927, of Journal of Industrial and Engineering Chemistry as corrected in July 15, 1929, issue. Cupric Sulphate. Reagent for chemical analysis, permissible impurities and amounts, test procedure.

American Chemical Society, Journal of Industrial and Engineering Chemistry. July 15, 1930. Cuprous Chloride. Reagent for chemical analysis, requirements on content of $CuCl$, permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Cupric Acetate. Description and properties, preparation and standard strengths of triturations, solutions, and dilutions for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Hydric Cupric Arsenite, Cupric Carbonate, Metallic Copper, Cupric Sulphate. Descriptions and properties, preparation and standard strengths of triturations for medicinal purposes.

American Railway Assn., Signal Section, 5028; 1928. Copper Sulphate. For use in gravity batteries, size range of crystals, chemical composition requirements.

American Water Works Assn. Water Works Practice Manual; 1925. Chemicals Used in Water Purification. Copper Sulphate. Requirements on content of crystalline copper sulphate, permissible arsenic.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Copper Carbonate. Official method for determination of copper oxide.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Anhydrous Cupric Sulphate. Reagent for chemical analysis, physical properties, test requirements for identity and purity.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Cupric Acetate. Reagent for chemical analysis, physical properties, test requirements for purity.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Cupric Sulphate. As a medicinal agent and as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights, labeling of poisons. *See* 830. Food and drugs act and regulations. *See* 810. Testing canned foods for copper. *See* 120. Copper base paint pigments. *See* 842.9. Copper carbonate fungicide. *See* 881.9.

839.34 Iron Compounds and Salts

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Ferric Acetate. Description and properties, preparation and standard strengths of triturations, solution, and dilutions for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Ferric Chloride. Description and properties, preparation and standard strengths of tincture, dilutions, and medications for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Ferro-Ferric Oxid, Iron by Hydrogen, Ferroso-Ferric Phosphate. Descriptions, properties, preparations and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Ferrous Arsenate, Bromid, Carbonate, Iodid, Lactate, Sulphate. Descriptions and properties, preparation and standard strengths of triturations for medicinal purposes.

American Pharmaceutical Assn. National Formulary; 1926. Ferric Glycerophosphate, Ferric Hypophosphite, Ferrous Lactate, Soluble Ferric Pyrophosphate, Albuminized Iron, Peptonized Iron. Descriptions and physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Sulphate of Iron to be Used in Water Treatment; 1922. For grade (a), prime green, selects, or stick crystals, or for grade (c), granular or sugar sulphate of iron, both of ferrous sulphate, sampling and chemical composition requirements.

American Water Works Assn. Water Works Practice Manual; 1925. Chemicals Used in Water Purification. Sulphate of Iron. Requirements on content of pure ferrous sulphate, permissible free acid, freedom from dirt and foreign matter.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Ferric Ammonium Sulphate. Reagent for chemical analysis, physical properties, purity requirements.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Ferric Chloride, Ferrous Sulphate. Reagents for chemical analysis, physical properties, identity tests, test requirements for purity and for strength.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Potassium Ferricyanide, Potassium Ferrocyanide. Reagents for chemical analysis, physical properties, test requirements for purity.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Saccharated Ferrous Carbonate, Ferric Chloride, Iron and Ammonium Citrate, Soluble Ferric Phosphate, Ferrous Sulphate, Exsiccated Ferrous Sulphate, Reduced Iron. For medicinal purposes, descriptions and physical properties, test requirements for identity and for purity. Recognized as standards in enforcement of Federal food and drugs act.

References.—Unit weights, labeling of poisons. *See* 830. Food and drugs act and regulations. *See* 810. Iron oxide pigments for paints. *See* 841.4.

839.35 Lead Compounds and Salts

American Chemical Society, Journal of Industrial and Engineering Chemistry. July 15, 1930. Lead Acetate. Reagent for chemical analysis, permissible kinds and amounts of impurities, test procedure.

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, vol. 3, No. 2, Apr. 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Lead Chromate. Requirements on purity, permissible soluble matter and carbon compounds, methods of test.

American Chemical Society, vol. 19, May, 1927, of Journal of Industrial and Engineering Chemistry. Lead Dioxide. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, vol. 3, No. 2, Apr. 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Lead Nitrate. Permissible insoluble matter, chloride, copper, iron, and substances not precipitated by hydrogen sulphide, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Plumbic Acetate. Description and properties, preparation and standard strengths of triturations, solution, dilutions, and medications for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Plumbic Carbonate, Plumbic Chromate, Plumbic Iodid, and Metallic Lead. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

American Pharmaceutical Assn. National Formulary; 1926. Lead Iodide, Red Lead Oxide. Descriptions and physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Lead Acetate, Lead Monoxide. As medicinal agents and as reagents for chemical analysis, physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Lead Nitrate, Lead Peroxide. Reagents for chemical analysis, physical properties, test requirements for identity and purity.

References.—Unit weights, labeling of poisons. *See* 830. Food and drugs act and regulations. *See* 810. Lead arsenate, insecticide. *See* 881.11. Lead pigments for paints. *See* 842.6.

839.36 Mercury Compounds and Salts

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, vol. 3, No. 2, Apr. 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Mercuric Chloride. Permissible nonvolatile matter, solubility in ether, and iron content, methods of test.

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, vol. 3, No. 2, Apr. 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Mercurous Chloride. Permissible nonvolatile matter, mercuric chloride, and sulphate, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Mercuric Chloride, Mercuric Cyanide. Descriptions and properties, preparation and standard strengths of tincture, dilutions, medications, and triturations for medicinal purposes.

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Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Mercurous Chloride (Calomel) in Tablets. Calomel in Calomel Ointment. Methods for determining amount of calomel.

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Assn. of Official Agricultural Chemists. Tentative and Official Methods of Analysis; 1930. Drugs. Mercuric Iodide in Tablets. Tentative method of determining the amount of mercuric iodide.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Mercurous Iodide, Mercuric Iodide, Mercuric Salicylate, Ammoniated Mercury. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Mercuric Bromide. Reagent for chemical analysis, physical properties, permissible ash.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Mercury, Mercuric Chloride, Mercuric Oxide, Mercurous Chloride. For medicinal purposes and as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standards in enforcement of Federal food and drugs act.

References.—Unit weights, labeling of poisons. *See* 830. Food and drugs act and regulations. *See* 810. Mercury base paint pigments. *See* 842.9. Mercurial seed disinfectants. *See* 881.9.

839.37 Silver Compounds and Salts

American Chemical Society, vol. 17, July, 1925, of Journal of Industrial and Engineering Chemistry as corrected in issue of July 15, 1929. Silver Nitrate. Reagent for chemical analysis, permissible impurities and amounts, test procedure.

American Chemical Society, Journal of Industrial and Engineering Chemistry. July 15, 1929. Silver Sulphate. A reagent for chemical analysis, permissible kinds and amounts of impurities and methods of testing.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Argentum Cyanid, Iodide, Chloride, Oxide, Phosphate and Metallic Silver. Descriptions and properties, preparation and strength standards for triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Argentum Nitrate. Description and properties, preparation and standard strengths for solution and dilutions for medicinal purposes.

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U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Silver Nitrate. As a medicinal agent and as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Silver Nitrate, Fused Silver Nitrate, Strong Silver Protein, Mild Silver Protein. For medicinal purposes, descriptions and physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

References.—Unit weights, labeling of poisons. *See* 830. Food and drugs act and regulations. *See* 810.

839.38 Zinc Compounds and Salts

American Assn. of State Highway Officials. Highway Bridges and Incidental Structures; 1931. Timber Preservatives. For zinc chloride, requirements on freedom from acid, permissible iron, required amount of chloride of zinc for the fused or solid material and for the concentrated liquid.

American Chemical Society. Journal of Industrial and Engineering Chemistry. July 15, 1929. Zinc, Low in Arsenic. A reagent for chemical analysis, permissible arsenic, iron, and matter insoluble in sulphuric acid, methods of test.

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American Chemical Society. Journal of Industrial and Engineering Chemistry, vol. 20, Sept., 1928, and Analytical Edition of J. I. E. C., April 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Zinc Chloride. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society. Journal of Industrial and Engineering Chemistry. July 15, 1930. Zinc Sulphate. Reagent for chemical analysis, permissible kinds and amounts of impurities, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Zinc Acetate, Bromide, Carbonate, Cyanid, Iodid, Chloride, Oxide, Phosphide, Sulphate, Valerianate, and Metallic Zinc. Descriptions and properties, preparation and standard strengths of triturations for medical purposes.

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American Railway Engineering Assn. 1929 Manual. Wood Preservation. Chemical Analysis of Zinc Chloride; 1926. Standardization of solutions, determination of insoluble zinc chloride, and of zinc, estimation of iron and alumina, and method for determining the strength of zinc chloride solution.

American Railway Engineering Assn. 1929 Manual. Wood Preservation. Preservatives; 1926. Includes zinc chloride, minimum percentage of iron and of soluble zinc chloride, freedom from acid.

American Society for Testing Materials D 199–27; 1927. Methods of Chemical Analysis of Zinc Chloride. For wood preservative, preparation and standardization of reagents, procedure for determination of insoluble or basic zinc chloride, determination of zinc by volumetric and gravimetric methods, estimation of iron and alumina.

American Wood Preserver's Assn. 1a; 1921. Method of Analysis for Zinc Chloride. Preparation of reagents, method for determination of insoluble basic zinc chloride, of zinc, iron and alumina.

American Wood Preserver's Assn. 17a; 1921. Zinc Chloride. Requirements for percentage of chloride of zinc and allowable iron, freedom from acid.

American Wood Preserver's Assn. 21a; 1922. Properties of Zinc Chloride Solutions at 60° F. Based on Chemically Pure Zinc Chloride. Tables showing percentage of zinc chloride in solutions of various specific gravities and degrees Baumé density, weight of solutions, pounds of zinc chloride per gallon for solutions expressed in percentage strengths.

American Wood Preserver's Assn. 22a; 1922. Methods of Calculating Dilutions and Concentrations of Zinc Chloride Solutions. Formula method and rectangle method explained and illustrated.

American Wood Preserver's Assn. 27a; 1923. Gravimetric Method of Analysis for Zinc Chloride. Test procedure for determination of insoluble basic zinc chloride and for zinc.

American Wood Preserver's Assn. 46a; 1931. Test for Determining the Approximate Strength of Zinc Chloride Solution. For weak solutions used in wood treating, test procedure for a rapid method by titration against silver nitrate.

Manufacturing Chemists Assn. of the U. S. Zinc Chloride Solution; 1922. Tables of specific gravity, percentage of zinc chloride, weight of solution, weight of zinc chloride in 1 cubic foot, percentage of 50 per cent zinc chloride, pounds of 50 per cent zinc chloride in 1 cubic foot, approximate corrections for temperature.

U. S. Gov., Federal Specifications Board TT–W–576; 1931. Zinc Chloride Wood Preservative for Ties and Structural Timbers. The technical requirements of this specifications are the same as those of spec. No. 17a of the Am. Wood Preservers Assn.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Zinc Acetate, Chloride, Oxide, Stearate, Sulphate. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Zinc Oxide. Reagent for chemical analysis, physical properties, identity tests, test requirements for purity and strength.

References—Unit weights, labeling poisons. *See* 830. Food and drugs act and regulations. *See* 810. Zinc arsenite, insecticide. *See* 881.19. Tests for zinc in canned foods. *See* 120. Perservative treatment of lumber. *See* 400.4. Zinc paint pigments. *See* 842.7.

839.39 Miscellaneous Compounds, Mixtures, and Salts of Metals

American Chemical Society. Industrial and Engineering Chemistry, Analytical Edition, vol. 3, No. 2, Apr. 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Cadmium Chloride ($CdCl_2\ 2\frac{1}{2}H_2O$). Permissible insoluble matter, nitrate, sulphate, ammonia, copper, iron, lead, zinc, and substances not precipitated by ammonium sulphide, methods of test.

American Chemical Society. Journal of Industrial and Engineering Chemistry, vol. 20, Sept., 1928, and Analytical Edition of J. I. E. C., July 15, 1930, and April 15, 1931 editions. Recommended Specifications for Analytical Reagent Chemicals. Magnesium Chloride. Permissible kinds and amounts of impurities, methods of test.

American Chemical Society. Journal of Industrial and Engineering Chemistry, Analytical Edition, vol. 3, No. 2, Apr. 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Magnesium Oxide. Permissible kinds and amounts of impurities, solubility in water, loss on ignition, methods of test.

American Chemical Society. Journal of Industrial and Engineering Chemistry. July 15, 1930. Magnesium Sulphate. Reagent for chemical analysis, requirements on neutrality, permissible kinds and amounts of impurities, methods of test.

American Chemical Society, vol. 19, May, 1927, of Journal of Industrial and Engineering Chemistry. Stannous Chloride. Reagents for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Chemical Society. Journal of Industrial and Engineering Chemistry, Analytical Edition, vol. 3, No. 2, Apr. 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Uranium Nitrate. Permissible insoluble matter, chloride, sulphate, alkalies and alkaline earths, heavy metals, iron, and uranous uranium, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Auric Chloride. Sodium Auro-Chloride. Descriptions and properties, preparation and standard strengths of triturations, solution, and dilutions for medicinal purposes

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Auric Sulphid, Metallic Gold. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Cadmium Sulphid, Cadmium Sulphate. Descriptions and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Cerium Oxalate. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Indium. Description of the metal and its properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Iridium. Description of the metal and its properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Lithium Benzoate, Lithium Carbonate. Descriptions and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Lithium Bromid. Description and properties, preparation and strength standards of triturations, tincture, dilutions, and medications for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Magnesium Carbonate, Oxide, Phosphate, Sulphate. Descriptions, properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Magnesium Chloride. Description and properties, preparation and standard strengths of triturations, tincture, dilutions, medications, and aqueous solution for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Manganous Acetate, Carbonate, Oxide. Descriptions and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Manganous Chloride. Description and properties, preparation and standard strengths of triturations, tincture, and dilutions for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Nickel Carbonate, Nickel Sulphate, Metallic Nickel. Descriptions and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Metallic Platinum. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Platinum Hydrochloride, Sodium Platino Chlorid. Descriptions and properties, preparation and standard strengths of triturations, solutions, dilutions, and medications for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Radium Bromide. Description and properties, preparation and strength standards of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Selenium. Description and properties, preparation and strength standards of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Strontium Carbonate. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Tellurium. Description and properties, preparation and standard strengths of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Metallic Tin. Description and properties, preparation and strength standards of triturations for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Uranium Nitrate. Description and properties, preparation and standard strengths of triturations, tincture, dilutions, and medications for medicinal purposes.

American Pharmaceutical Assn. National Formulary; 1926. Lithium Benzoate, Lithium Bromide, Lithium Carbonate, Lithium Citrate, Lithium Salicylate. Descriptions and physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

American Pharmaceutical Assn. National Formulary; 1926. Magnesium Chloride. Description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

American Pharmaceutical Assn. National Formulary; 1926. Soluble Manganese Citrate, Soluble Manganese Glycerophosphate, Manganese Hypophosphite. Descriptions and physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Gov., Federal Specifications Board. O-S-61; 1930. Nickel Salts for Electroplating and Electrotyping. For nickel sulphate, nickel ammonium sulphate, and nickel chloride, requirements on composition, content of nickel, permissible iron, zinc, copper, free acid, and insoluble matter, methods of sampling and test.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Gold Chloride, Magnesium Chloride, Platinic Chloride, Stannous Chloride. Reagents for chemical analysis, physical properties, test requirements for purity.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Milk of Magnesia, Magnesium Carbonate. For medicinal purposes, description and physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Magnesium Oxide, Magnesium Sulphate. For medicinal purposes and as reagents for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Manganese Dioxide, Manganese Sulphate. Reagents for chemical analysis, physical properties, test requirements for purity.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Strontium Salicylate. For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights, labeling of poisons. *See* 830. Food and drugs act and regulations. *See* 810. Magnesium arsenate, insecticide. *See* 881.19. Tests for metals in canned foods. *See* 120.

839.4 GASES

839.41 Carbon Dioxide

839.42 Hydrogen

Underwriters' Laboratories. Tentative Standards. Oxygen and Hydrogen for Industrial Uses, Electrolytic Oxygen and Hydrogen Plants; 1923. Type and color of pipe, maximum size for high pressures, joint luting materials, threading of tubes to oxygen and hydrogen cylinders, provision of vents, seals, taps, pressure reliefs, and gages. Rules for starting and stopping generation, for changing connection, methods of sampling and testing purity of gases, care and operation of plant.

839.43 Oxygen

Underwriters' Laboratories. Tentative Standards. Oxygen and Hydrogen for Industrial Uses, Electrolytic Oxygen and Hydrogen Plants; 1923. Type and color of pipe, maximum size for high pressures, joint luting materials, threading of tubes to oxygen and hydrogen cylinders, provision of vents, seals, taps, pressure reliefs, and gages. Rules for starting and stopping generation, for changing connection, methods of sampling and testing purity of gases, care and operation of plant.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Oxygen. For medical purposes, physical properties, identity test, test requirements for purity and strength. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

839.44 Chlorine

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Chlorin. Description, properties, and preparation, preparation and standard strengths of solution and of dilutions for medicinal purposes.

839.45 Nitrous Oxide

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Nitrogen Monoxide. (Nitrous Oxide.) For medicinal purposes, physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Food and drugs act and regulations. *See* 810.

839.49 Miscellaneous Gases

References.—Illuminating gas. *See* 997.2.

839.5 HYDROQUINONE (HYDROCHINONE)

839.6 CARBON DISULPHIDE

American Chemical Society, vol. 19, May, 1927, of Journal of Industrial and Engineering Chemistry. Carbon Disulphide. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Carbon Disulphide. Description and properties, preparation and standard strengths of tincture, dilutions, and medications for medicinal purposes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Carbon Disulphide. Reagent for chemical analysis, physical properties, identity tests, test requirements for purity.

References.—Unit weights. *See* 830.

839.7 CARBON TETRACHLORIDE

American Chemical Society. Journal of Industrial and Engineering Chemistry, vol. 19, May, 1927, and Analytical Edition of J. I. E. C., vol. 3, No. 2, Apr. 15, 1931. Recommended Specifications for Analytical Reagent Chemicals. Carbon Tetrachloride. Permissible kinds and amounts of impurities, methods of test.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Chloroform and Carbon Tetrachloride. For carbon tetrachloride as a medicinal, carbon tetrachloride in capsules, and carbon tetrachloride mixtures, tentative method for determining amount of carbon tetrachloride.

U. S. Gov., Federal Specifications Board O-F-380; 1930. Fire Extinguishing Liquid. Carbon Tetrachloride Base. Suitable for hand fire extinguishers in fighting incipient electrical fires, requirements on general qualities, appearance, specific gravity, noncorrosive qualities, permissible impurities, cold test, distillation test, electrical conductivity test.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Carbon Tetrachloride. As a medicinal agent and also as a reagent for chemical analysis, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Unit weights. *See* 830. Food and drugs act and regulations. *See* 810.

839.8 LIQUID CHLORINE

American Water Works Assn. Water Works Practice Manual; 1925. Chemicals Used in Water Purification. Liquid Chlorine. Shall be practically chemically pure and anhydrous.

839.9 MISCELLANEOUS SPECIFICATIONS FOR CHEMICALS AND CHEMICAL COMPOUNDS

American Chemical Society, vol. 19, May, 1927, of Journal of Industrial and Engineering Chemistry. Arsenic Trioxide. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Chemical Society, vol. 17, July, 1925, of Journal of Industrial and Engineering Chemistry. Iodine. Reagent for chemical analysis, permissible impurities and amounts, test requirements and procedure.

American Chemical Society, Journal of Industrial and Engineering Chemistry, Analytical Edition, July 15, 1929, and April 15, 1931, editions. Recommended Specifications for Analytical Reagent Chemicals. Bromine. Requirements on specific gravity, nonvolatile matter, iodine, organic bromine compounds, and sulphur compounds, methods of test.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. A compilation of many chemical compounds used in homeopathic medicine with descriptions and properties of the compound, methods of preparation and standard strengths of triturations, tinctures, solutions, dilutions, and medications.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Bromin. Description and properties, preparation and standard strengths of solutions and dilutions for medicinal purposes.

American Institute of Homeopathy. Homeopathic Pharmacopoeia of the U. S.; 1914. Sulphur. Description and properties, preparation and standard strengths of triturations, tincture, dilutions, and medications for medicinal purposes.

American Pharmaceutical Assn. National Formulary; 1926. Acetic Ether (Ethyl Acetate). Description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

American Pharmaceutical Assn. National Formulary; 1926. Bromine. Description and physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

American Society for Testing Materials. Tentative Methods D 268-31T; 1931. Method of Sampling and Testing Lacquer Solvents and Diluents. Applies to solvents and diluents for use in manufacture of nitrocellulose lacquer, method of sampling, methods of test for specific gravity, color, distillation, residue, nonvolatile matter, residual odor, water, acidity, alkalinity, ester value, copper corrosion.

American Society for Testing Materials. Tentative Specifications D 302-30T; 1930. Ethyl Acetate (85 to 88 Per Cent Grade). Requirements for specific gravity, color, distillation range, residue, odor, water, acidity, and ester value according to A. S. T. M. method D 268. For use with cellulose ester coatings.

American Society for Testing Materials. Tentative Specifications D 303–30T; 1930. Normal Butyl Acetate (88 to 92 per cent Grade). Requirements on specific gravity, color, distillation range, residue, odor, water, acidity, and ester value, according to A. S. T. M. method D 268. For use with cellulose ester coatings.

American Society for Testing Materials. Tentative Specifications D320–30T; 1930. Butyl Propionate (90 to 93 per cent grade). Requirements on specific gravity, color, distillation range, residue, odor, water, acidity, and ester value, using A. S. T. M. methods of test D 268. For use with cellulose ester coatings.

American Society for Testing Materials. Tentative Specifications D321–30T; 1930. Ethyl Lactate (Synthetic). Requirements on specific gravity, color, distillation range, residue, odor, water, acidity, and ester value, using A. S. T. M. methods of test D 268. For use with cellulose ester coatings.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Preservatives and Artificial Sweeteners. Abrastol (Asaprol). Tentative method for tests for presence of.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Preservatives and Artificial Sweeteners. Insoluble Fluorides, Fluoborates, fluosilicates, etc., preparation of sample, test methods for indicating presence of insoluble fluorides.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Preservatives and Artificial Sweeteners. Saccharin. Preparation of sample, qualitative test methods, quantitative test.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Preservatives and Artificial Sweeteners. Soluble Fluorides. Qualitative test methods for indicating presence of.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Preservatives and Artificial Sweeteners. Sucrol or Dulcin. Tentative test methods for indicating presence of.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 47. Tincture of Iodine. Required amounts of potassium iodide, water, and iodine, method of preparation, for use in testing fabrics.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Arsenic trioxide. Sample No. 83 prepared and sold by the bureau, for use in industry and by others as an oxidimetric standard.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Refined silicon. Sample No. 57 prepared and sold by the bureau with a certificate of analysis, for use by industrial organizations and others as a comparison standard for checking the accuracy of analyses of similar material, etc.

U. S. Gov., Treasury Dept., Bureau of Prohibition, Regulations No. 3; 1927, and Appendix of 1930. Industrial Alcohol and Denatured Alcohol. Pyridine bases included in Appendix, used in preparation of specially denatured alcohol permitted in the manufacture of acetphenetidin, chloral hydrate, dichlorethane, ethyl chloride, and other compounds, requirements on behavior with cadmium chloride and with Nessler's reagent, boiling point, and water content.

U. S. Gov., Treasury Dept., Bureau of Prohibition. Regulations No. 3; 1927, and Appendix of 1930. Industrial Alcohol and Denatured Alcohol. Appendix contains specifications for calol ethatate used for denaturing ethyl acetate, requirements on specific gravity, sulphur content, distillation range, reaction with Schiff's reagent, and solubility in alcohol.

U. S. Gov., Treasury Dept., Bureau of Prohibition, Regulations No. 3; 1927, and Appendix of 1930. Industrial Alcohol and Denatured Alcohol. Appendix contains specifications for aldehol, grade A, used in the preparation of completely denatured alcohol, requirements on specific gravity, distillation range, behavior with Schiff's reagent, solubility in alcohol, and iodine number.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Amidopyrine, Amyl Nitrite, Antipyrine. For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Arsenic Trioxide. Reagent for chemical analysis, physical properties, test requirements for identity and for purity.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Bromine. Reagent for chemical analysis, physical properties, identity tests, test requirements for purity and for strength.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Ethyl Aminobenzoate, Ethyl Chaulmoograte, Ethyl Chloride. For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standards in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Phosphorus. For medicinal purposes, physical properties, test requirements for identity and for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Washed Sulphur, Precipitated Sulphur, Sublimed Sulphur. For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Other chemicals for medicinal purposes. *See* 810–829. Iodine for medicinal purposes. *See* 814.1. Unit weights, labeling of poisons. *See* 830. Food and drugs act and regulations. *See* 810.

840–849 PIGMENTS, PAINTS, AND VARNISHES

840. GENERAL ITEMS RELATING TO PAINTS AND PAINTING

840.1 PAINTS AND PAINTING

American Railway Assn. Signal Section 12022; 1922. Paint and Painting. Ingredients of paint and of drier, allowable volatile matter, general quality of linseed oil, fineness test requirements for pigment, preparation of surfaces and application of paint, number of coats.

American Railway Engineering Assn. 1929 Manual. Buildings for Railway Uses. Painting and Glazing; 1929. Number of coats and kinds of paint, general procedure for painting exterior and interior wood work, steel and iron work, sheet metal work, plaster, brick, concrete, signs, radiators, piping, etc.

National Assn. Sheet Metal Contractors. Standard Practice in Sheet Metal Work; 1929. Section XII. Protective Coatings and Paints. Includes recommendations on painting practice and suitable pigments for tin and galvanized roofing, gutters, cornices, metal doors and trim, coloring and oxidizing procedure and solutions for sheet copper structural parts.

U. S. Gov., Dept of Commerce, Bureau of Standards, T274; 1924. Use of U. S. Gov. Specification Paints and Paint Materials. Comments on the properties and recommended methods of use of various paints and paint materials for which Federal specifications exist, but all paints covered by Federal specifications are not commented on.

840.2 SAFETY CODES FOR HANDLING AND STORAGE OF PAINTS AND VARNISHES

Associated Factory Mutual Fire Insurance Companies. Pyroxylin Lacquer; 1930. Information on hazards present and safeguards recommended in storage, mixing, spraying, dipping, and spreading of pyroxylin lacquer as regards location of buildings or rooms, ventilation, protection of electrical equipment, provision of automatic sprinklers, good housekeeping, etc.

Associated Factory Mutual Fire Insurance Companies. Safeguards for the Application and Drying of Japan, Enamel, Paint, and Varnish; 1929. Recommended safeguards for use in storage and mixing and application of finishes as regards isolation of materials and rooms, ventilation, provision of automatic sprinklers, provision of overflow pipes and drains for dip tanks, construction of drying and baking ovens, etc.

National Board of Fire Underwriters. Paint Spraying and Spray Booths; 1928. Location, waterproofing and drainage of floors, construction of metal spray booths, ventilation and exhaust systems, electrical equipment, requirements for containers, piping, sprinkler equipment, and maintenance.

References.—Dip tanks for application of varnish. *See* 956.2. Enameling and japanning ovens. *See* 614.9.

840.3 TERMS RELATING TO PAINT

American Society for Testing Materials. D 16–24; 1924. Definitions of Terms Relating to Paint Specifications.

840.4 PAINT COLORS

International Soc. of Master Painters and Decorators (Inc.). Color Card and Color Pack; 1930. Standard paint colors with a number designation for each color, standard backgrounds for graining, and light reflective values for various colors.

U. S. Gov., Dept. of Commerce, Bureau of Standards, Limitation of Variety No. 1; 1924. Paints and Varnishes. Limitation recommended by industry for the number of shades or tints to be produced by any one concern for various kinds of paint, as house paint, interior paint, etc., permissible minimum sizes of containers.

840.5 TESTS OF PAINTS AND VARNISHES

American Society for Testing Materials D 34–30; 1930. Methods of Routing Analysis of White Pigments. Approved by American Standards Assn. as K15–1930. Method of analysis of lead and other pigments where there are very small amounts of iron, methods of analysis for basic carbonate of lead, basic sulphate of lead, zinc-lead and leaded zinc, zinc oxide, lithophone, calcium pigments, gypsum, terra alba, plaster of paris, barium pigments and silica pigments.

American Society for Testing Materials D 50–27; 1927. Methods of Routine Analysis of Yellow, Orange, Red, and Brown Pigments Containing Iron and Manganese. Methods of test for tinting strength and for added coloring matter, analysis of indian reds, red oxides, ochers, venetian red, siennas and umbers, for chemical composition.

American Society for Testing Materials D 56–21; 1921. Approved by American Standards Assn. as K8–1923. Methods of Test for Flash Point of Volatile Flammable Liquids. For liquids flashing below 175° F. except fuel oils for which A. S. T. M. method D 93 is preferred, dimensions of Tag closed tester, dimensions, graduation and accuracy of thermometer, test procedure.

American Society for Testing Materials D 126–27; 1927. Methods of Routine Analysis of Yellow and Orange Pigments Containing Chromium Compounds, Blue Pigments and Chrome Green. Test methods for tinting strength, added coloring matter and chemical composition for yellow and orange pigments, blue pigments, ultra-marine blue, cobalt blue, sublimed blue lead, and green pigments.

American Society for Testing Materials. D 153–27; 1927. Methods of Test for Specific Gravity of Pigments. Description of apparatus and testing procedure for (*a*) routine testing of several samples simultaneously, (*b*) for tests requiring highest accuracy, (*c*) for rapid and accurate testing of single samples.

American Society for Testing Materials. D 185–29; 1929. Methods of Test for Coarse Particles in Dry Pigments and Coarse Particles and Skins in Mixtures of Pigments and Vehicles. Using 3-inch No. 325 sieve, test procedure for dry pigments practically insoluble in water, for water soluble pigments, pastes in oil, pastes in japan, mixed paints and enamels.

American Society for Testing Materials. D 215–29; 1929. Methods of Routine Analysis of White Linseed Oil Paints. Preparation of sample, preparation of reagents, methods for determination of water, volatile thinner, nature of thinner, percentage of pigment and of nonvolatile matter, test of nonvolatile vehicle for mineral oil, iodine number, rosin, qualitative and quantitative analysis of pigment.

American Society for Testing Materials. D 278–31; 1931. Method of Test for Alkalinity or Acidity of Pigments. Test procedure.

American Society for Testing Materials. D 279–31; 1931. Methods of Test for Bleeding of Pigments. Test procedure for dry pigments to be used in cellulose ester lacquers, for dry pigments to be used in oil or oleo-resinous paints and enamels, for pastes in oil, and for pastes in japan.

American Society for Testing Materials. D 280–31; 1931. Methods of Test for Hygroscopic Moisture (and Other Matter Volatile under Test Conditions) in Pigments. Apparatus and test procedure for pigments that do not decompose at 110° C., and for pigments that do decompose at 110° C.

American Society for Testing Materials D 281–31; 1931. Method of Test for Absorption of Pigments. Test procedure using raw linseed oil.

American Society for Testing Materials D 307–30; 1930. Method of Analysis for the Color Characteristics of Paint in Terms of Fundamental Physical Units. Recommended apparatus and test procedure using standard reflecting surface and photometer.

American Society for Testing Materials. Tentative Specifications. D 332–31T; 1931. Method of Test for Tinting Strength of Pigments. Requirements on apparatus and test procedure for comparison tests of sample and agreed upon standard white pigment, formula for computing tinting strength.

American Society for Testing Materials. Tentative Method D 333–31T; 1931. Methods of Test for Nitrocellulose Clear Lacquers and Lacquer Enamels. Test procedure for determination of weight, drying time, color, gloss, homogeneity, print test, bending test, and outdoor exposure test.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. White Linseed Oil Paints. Tentative methods of analysis are the same as specification D 215—29 of the American Society for Testing Materials.

840.9 MISCELLANEOUS REQUIREMENTS FOR PAINTS

References.—Lime for use in manufacture of varnish. *See* 517.2.

841. MINERAL PIGMENTS, DRY AND PASTE

841.1 ASBESTINE PIGMENTS

841.2 BARYTES PIGMENTS

841.3 GRAPHITE PIGMENTS

841.4 IRON OXIDE PIGMENTS

841.41 Iron Oxide, Red Pigments

American Railway Assn. Mechanical Division. Recommended Practice; 1922. Paste, Oxide of Iron. Semipaste paints of red or brown for freight cars. Composition of the semipaste and of the pigment.

American Society for Testing Materials D 84–27; 1927. Mineral Iron Oxide. Covers iron oxide and iron hydroxide pigments in dry or paste form, red and brown colors, limiting percentages of ferric oxide, other materials, loss on ignition, and coarse particles in dry pigment, of pigment, linseed oil, moisture, and coarse particles in paste.

U. S. Gov., Federal Specifications Board 13b; 1925. Iron Oxide and Iron Hydroxide Paints. For pigment, requirements on percentages of ferric oxide, insoluble siliceous matter, and loss on ignition, freedom from organic colors, for semipaste, percentages of pigment, linseed oil, moisture, coarse particles and skins, methods of sampling and test.

References.—Definitions, methods of testing pigments. *See* 840.3, 840.5.

841.42 Iron Oxide, Brown Pigments

References.—Brown pigments. *See* 841.41.

841.49 Miscellaneous Red, Brown, and Maroon Pigments

References.—Ocher pigments of iron oxide. *See* 841.5.

841.5 OCHER (PIGMENT)

American Society for Testing Materials D 85–27; 1927. Ocher. Covers ferrous earthy pigments in dry or paste form, limiting percentages of coarse particles, iron oxide, lime, lead chromate, and organic colors in dry pigment, and of pigment, linseed oil or japan, coarse particles, moisture, nonvolatile matter in japan, for the paste.

U. S. Gov., Federal Specifications Board TT–O–111; 1931. Ocher, Dry and Paste. For pigment, requirements on percentages of coarse particles, iron oxide, lime, and absence of lead chromate and organic colors, for paste in oil and paste in japan, percentages of pigment, linseed oil or japan, moisture, coarse particles and skins, methods of test and sampling.

References.—Definitions, methods of testing pigments. *See* 840.3, 840.5.

841.6 SIENNAS (PIGMENTS)

841.7 UMBER (PIGMENT)

841.8 WHITING OR PARIS WHITE

References.—Ceramic whiting, calcium carbonate. *See* 546, 833.3.

842. CHEMICAL PIGMENTS (DRY AND PASTE)

842.1 BLANC FIXE AND TITANIUM OXIDE (PIGMENTS)

American Society for Testing Materials D 186–29; 1929. Methods of Routine Analysis of Titanium Pigments. Test requirements for color and for tinting strength, methods of qualitative analysis, determination of moisture, matter soluble in water, titanium oxide, barium sulphate, calcium sulphate, and iron oxide, preparation of reagents, coarse particle determination according to A. S. T. M. method D185.

References.—Titanium mixed pigments. *See* 842.87. Definitions of terms. *See* 840.3.

842.2 CHINESE, PRUSSIAN, OR BRONZE BLUE (PIGMENTS)

American Society for Testing Materials D 261–28; 1928. Prussian Blue. Dry pigment or paste, also known as Chinese or iron blue, for dry pigment the maximum percentage soluble in water; for paste in oil, limiting percentages of pigment, linseed oil, moisture, and coarse particles; for paste in japan, percentages of pigment, japan, coarse particles, and nonvolatile matter.

References.—Definitions of terms, methods of testing pigments. *See* 840.3, 840.5.

842.3 ULTRAMARINE BLUE (PIGMENT)

American Society for Testing Materials D 262–28; 1928. Ultramarine Blue. For dry pigment, percentage of coarse particles; for paste in oil, percentages of pigment, linseed oil, moisture and volatile matter, and coarse particles; for paste in japan, percentages of pigment, japan, coarse particles, and nonvolatile matter.

U. S. Gov., Federal Specifications Board TT–U–451; 1930. Ultramarine Blue, Dry, Paste in Japan, and Paste in Oil. For dry pigment, requirements on composition, percentage of coarse particles, absence of organic colors or lakes. For paste in oil and paste in japan, requirements on percentages of pigment, vehicle, volatile matter, and coarse particles, methods of sampling and test.

References.—Definitions of terms. *See* 840.3. Methods of testing pigments. *See also* 840.5.

842.4 CARBON BLACK, LAMPBLACK, BONE BLACK, ETC.

American Society for Testing Materials D 209–30; 1930. Lampblack. Limiting percentages of coarse particles, ash, and acetone extract for dry pigment, and of pigment, vehicle, and coarse particles in the paste, percentage of volatile matter in oil paste and of nonvolatile matter in the vehicle of japan paste.

American Society for Testing Materials D 210–30; 1930. Bone Black. Limiting percentages of ash, coarse particles, and acetone extract for dry pigment, and of pigment, linseed oil of japan vehicle, and coarse particles in the paste, percentage of nonvolatile matter in japan.

American Society for Testing Materials D 305–31; 1931. Method of Routine Determination of Acetone Extract in Dry Lampblack and Dry Bone Black. Standard test procedure requiring strict following.

U. S. Gov., Federal Specifications Board TT–B–601; 1930. Bone Black, Dry, Paste in Japan, and

Paste in Oil. For dry pigment, requirements on manufacture, percentages of coarse particles, ash, ash insoluble in acids, acetone extract, test of tone. For paste in oil and paste in japan, requirements on percentages of pigment, volatile matter, vehicle, and coarse particles, methods of sampling and test.

U. S. Gov., Federal Specifications Board TT-L-71; 1930. Lampblack, Dry, Paste in Japan, and Paste in Oil. For dry pigment, requirements on manufacture, percentages of coarse particles, ash, acetone extract. For paste in oil and for paste in japan, requirements on general quality, percentages of pigment, vehicle, volatile matter, and coarse particles, methods of sampling and testing.

References.—Other black pigments. *See* 842.81, 843.31. Definitions, methods of testing pigments. *See also* 840.3, 840.5.

842.5 CHROMIUM COLORS (PIGMENTS) (GREEN, YELLOW)

American Society for Testing Materials D 211-27; 1927. Chrome Yellow. Limiting percentages of soluble matter, other substances other than insoluble lead compounds, organic colors, and coarse particles for dry pigment, and of pigment, linseed oil or japan vehicle, and coarse particles in the paste, volatile matter in oil paste, and nonvolatile matter in japan vehicle.

American Society for Testing Materials D 212-27; 1927. Pure Chrome Green. Limiting percentages of lead chromate, impurities, and coarse particles in dry pigment, and of pigment, linseed oil or japan vehicle, and coarse particles in the paste, percentage of nonvolatile matter in japan vehicle.

American Society for Testing Materials D 213-27; 1927. Reduced Chrome Green. Limiting percentages of barium sulphate and insoluble siliceous material, of insoluble lead compounds and iron blue, of lead chromate, calcium oxide, and coarse particles in the dry pigment, and of pigment, linseed oil or japan vehicle, and coarse particles in the paste, nonvolatile matter in japan vehicle.

American Society for Testing Materials D 263-28; 1928. Chrome Oxide Green. For dry pigment, limiting percentages of chromium and coarse particles; for the paste, percentages of pigment, linseed oil, and coarse particles.

U. S. Gov., Federal Specifications Board TT-C-291; 1931. Chrome Yellow. Covers grade commonly known as "C. P." pigment and paste, for pigment requirements on allowable percentages of coarse particles, matter soluble in water, substances other than lead compounds, organic colors or lakes, for paste in oil and for paste in japan, required pigment, allowable vehicle, volatile matter, and coarse particles, methods of test.

U. S. Gov., Federal Specifications Board TT-C-231; 1930. Chrome Oxide Green. For dry pigment, requirements on percentages of total chromium, coarse particles, and matter soluble in water. For paste in oil, requirements on percentages of pigment, linseed oil, water and other volatile matter, coarse particles and skins, methods of testing.

U. S. Gov., Federal Specifications Board TT-C-236; 1930. Pure Chrome Green, Dry, Paste in Japan, and Paste in Oil. For dry pigment, requirements on composition, percentages of coarse particles and of matter soluble in water. For paste in oil and for paste in japan, requirements on percentages of pigment, vehicle, volatile matter, and coarse particles, methods of sampling and testing.

References.—Definitions, methods of testing pigments. *See also* 840.3, 840.5. Green chromium pigments. *See also* 842.85.

842.6 LEAD PIGMENTS

842.61 Blue-Lead Pigments

842.62 Litharge Pigments

842.63 Red-Lead Pigments

American Railway Assn. Mechanical Division. Recommended Practice; 1922. Lead, Red. 85 per cent and 95 per cent grades of dry red lead pigment, chemical composition, fineness, and color requirements.

American Railway Assn. Mechanical Division. Recommended Practice; 1922. Lead, Red, and Oil. Composition, properties and color of the paste, composition of the pigment.

American Railway Assn. Mechanical Division. Recommended Practice; 1922. Lead, Red, Extended Paste Paint. Paste paint of red lead extended with an inert pigment, composition, properties and color of the paste, composition of the pigment.

American Society for Testing Materials D49-29; 1929. Methods of Routine Analysis of Dry Red Lead. Approved by American Standards Assn. as K16-1930. Methods for determination of moisture content, presence of organic coloring matter, determination of total lead and insoluble matter, lead peroxide, true red lead, zinc, matter insoluble in water, silica, carbon dioxide, soluble sulphate, and iron oxide.

American Society for Testing Materials D 83-31; 1931. Red Lead. Limiting percentages of true red lead, impurities, lead monoxide, and coarse particles in the dry pigment, and of pigment, linseed oil, moisture and coarse particles in the paste, mixing proportions of the red lead with oil, turpentine, and drier which shall produce good brushing paint.

U. S. Gov., Federal Specifications Board TT-R-191; 1931. Red Lead, Dry and Paste. For 85 per cent and 95 per cent grades of pigment, requirements on percentages of true red lead, impurities, lead monoxide and coarse particles, for paste, percentages of pigment, linseed oil, moisture, coarse particles and skins, brushing quality tests, methods of sampling and testing.

References.—Definitions, methods of testing pigments. *See also* 840.3, 840.5.

842.64 White-Lead Pigments

American Railway Assn. Mechanical Division. Recommended Practice; 1925. Lead, White, for Lettering. Composition of the paste and of the pigment for two grades of white lead paste, fineness of pigment.

American Society for Testing Materials D 81-31; 1931. Basic Carbonate White Lead. For dry pigment, paste in oil, or semipaste in oil used as pigment or in putty, requirements on content of coarse particles, lead carbonate and impurities for dry pigment, and on content of pigment, linseed oil, moisture, and coarse particles for paste and semipaste.

American Society for Testing Materials D 82-24; 1924. Basic Sulphate White Lead. In dry pigment or paste form, limiting percentages of coarse particles, lead oxide, zinc oxide, and impurities, for the dry pigment, limiting percentages of pigment, linseed oil, moisture, and coarse particles for the paste.

U. S. Gov., Federal Specifications Board TT-W-261; 1931. Basic Sulphate White Lead, Dry and Paste in Oil. Requirements on fineness, chemical composition and impurities of dry pigment, composition of the paste, method of sampling, laboratory examination of pigment and paste, preparation of reagents.

U. S. Gov., Federal Specifications Board TT–W–251; 1930. Basic Carbonate White Lead, Dry, Paste in Oil, and Semipaste in Oil. For dry pigment, requirements on composition, percentages of coarse particles, lead carbonates, and impurities. For paste and semipaste in oil, requirements on percentages of pigment, oil, moisture and volatile matter, coarse particles and skins, methods of testing.

References.—Other white lead pigments. *See* 842.87. Definitions, methods of testing pigments. *See also* 840.3, 840.5.

842.69 Miscellaneous Lead Pigments

References.—Lead chromate pigments. *See* 842.5. Leaded zinc oxide pigments. *See* 842.7. Pigments according to color. *See* 842.8.

842.7 ZINC OXIDES AND ZINC SULPHIDES (PIGMENTS)

American Society for Testing Materials D 79–24; 1924. Zinc Oxide. In form of dry pigment or ground in oil to form paste, grade size and permissible amounts of impurities for dry pigment of American process or French process types, percentages of pigment, of linseed oil, and allowable amounts of impurities in the paste.

American Society for Testing Materials D 80–24; 1924. Leaded Zinc Oxide. Dry pigment or paste, for high-leaded and for low-leaded dry pigment, required percentage limits for coarse particles, zinc oxide, soluble salts, and impurities, for the paste required percentage limits for pigment, oil, moisture, and coarse particles.

American Society for Testing Materials D 208–26; 1926. Lithopone. Limiting percentages of coarse particles, zinc sulfide, zinc oxide, soluble material, and barium sulfate in the dry pigment, and of pigment, linseed oil, and coarse particles in the paste.

U. S. Gov., Federal Specifications Board TT–Z–301; 1931. Zinc Oxide, Dry and Paste. For American process and for French process types, requirements on percentages of coarse particles, zinc oxide, sulphur, and impurities in pigment, percentages of pigment, linseed oil, moisture, coarse particles and skins in the paste, methods of sampling and test.

U. S. Gov., Federal Specifications Board TT–Z–321; 1931. Leaded Zinc Oxide, Dry and Paste. For high-leaded and low-leaded pigment, requirements on percentages of coarse particles, zinc oxide, water soluble salts, moisture and impurities for pigment, and percentages of pigment, linseed oil, moisture, coarse particles and skins in the paste, methods of sampling and test.

References.—Definitions, methods of testing pigments. *See also* 840.3–840.5. Other zinc pigments. *See* 842.87.

842.8 MISCELLANEOUS PIGMENTS, DRY AND PASTE, CLASSIFIED BY COLOR

842.81 Black and Gray Pigments

American Railway Assn. Mechanical Division. Recommended Practice; 1922. Paint, Black. A semipaste paint for use as a protective or finishing paint on freight cars. Composition of the semipaste and of the pigment.

U. S. Gov., Federal Specifications Board 14b; 1925. Black Paint, Semipaste and Ready Mixed. For pigment, requirements on percentages of carbon, of lead oxide, and total of lead oxide, iron oxide, insoluble mineral matter, and loss on ignition, for semipaste, percentages of pigment, linseed oil, moisture, coarse particles and sinks, methods of sampling and test.

References.—Specifications and methods of test for lampblack and bone black pigments. *See* 842.4. Definitions, methods of testing pigments. *See also* 840.3, 840.5.

842.82 Blue Pigments

842.83 Brown Pigments

References.—Iron oxide brown pigments. *See* 841.41.

842.84 Buff, Drab, and Slate Pigments

842.85 Green and Olive Pigments

U. S. Gov., Federal Specifications Board 137a; 1927. Olive Drab Paint (Semipaste and Ready-Mixed). For pigment, requirements on percentages of white lead, zinc oxide and white mineral pigments, methods of test.

U. S. Gov., Federal Specifications Board TT–P–71; 1930. Green Paints, Ready Mixed and Semipaste. For the pigment, requirements on composition, percentages of color, acid soluble CaO, barium sulphate, insoluble materials, and coarse particles. For the semipaste and ready-mixed paint, requirements on content of pigment, linseed oil, volatile matter, and coarse particles, weight of paint, methods of testing.

References.—Chromium pigments. *See also* 842.5. Definitions, methods of testing pigments. *See also* 840.3, 840.5.

842.86 Red Pigments

American Society for Testing Materials D 264–28; 1928. Commercial Para Red. Composed of para nitraniline red toner precipitated on barium sulphate base, for dry pigment limiting percentages of organic coloring matter, barium sulphate, siliceous material, coarse particles; for paste in oil, percentage of pigment, linseed oil, moisture, coarse particles; for paste in japan, percentages of pigment, japan, coarse particles, nonvolatile matter.

References.—Definitions, methods of testing pigments. *See* 840.3, 840.5. Iron oxide pigments, red. *See* 841.41. Red lead pigments. *See* 842.63.

842.87 White Pigments

U. S. Gov., Federal Specifications Board 10b; 1925. White Paint and Tinted Paints Made on a White Base, Semipaste and Ready Mixed. For pigment, requirements on percentages of white lead, zinc oxide, and other white pigments and tinting colors, for semipaste, requirements on content of pigment, linseed oil, moisture, coarse particles and skins, methods of sampling and test.

U. S. Gov., Federal Specifications Board 21b; 1927. Interior Lithopone Paint, White and Light Tints, Flat or Eggshell Finish. For pigment, requirements on percentages of lithopone, soluble matter, and tinting matter, for semipaste, requirements on amount of pigment, liquid, coarse particles and skins, composition and nonvolatile matter in liquid, methods of sampling and test.

U. S. Gov., Federal Specifications Board 67; 1923. Gloss Interior Lithopone Paint, White and Light Tints. For pigment, requirements on content of lithopone, zinc oxide, tinting and extending pigments, soluble matter, and content of zinc sulphide in lithopone.

U. S. Gov., Federal Specifications Board 278; 1925. Outside White Titanium-Zinc Paint, Semipaste and Ready-Mixed. For pigment, requirements on content of titanium pigment, zinc oxide pigment, extending pigment, soluble matter, freedom from lead and sulphide sulphur, methods of test.

References.—Whiting. *See* 841.8. Other titanium, white lead, and zinc pigments. *See* 842.1, 842.64, 842.7. Definitions, methods of testing pigments. *See* 840.3, 840.5.

842.88 Yellow, Cream, and Straw Pigments

Referenees.—Yellow chromium pigments. *See* 842.5. Ocher pigments. *See* 841.5.

842.9 MINERAL AND CHEMICAL PIGMENTS, DRY AND PASTE, NOT ELSEWHERE CLASSIFIED

American Concrete Institute. Proposed Recommended Practice for the Use of Pigment Admixtures in Troweled Concrete Surfaces. Proceedings of A. C. I., Vol. 27, p. 975 (April, 1931, Journal). For Inorganic pigments, requirements on insolubility, freedom from soluble salts and acids, fastness to sunlight, heat, alkalies, and weak acids, permissible calcium sulphate and moisture, fineness, purity, methods of testing pigments, use of pigments in concrete.

American Society for Testing Materials D 283–29; 1929. Method of Routine Analysis of Dry Cuprous Oxide. Method for determination of total copper and of cuprous oxide.

American Society for Testing Materials D 284–29; 1929. Method of Routine Analysis of Dry Mercuric Oxide. Alkalinity test by A. S. T. M. method D 278, preparation of reagents, methods of determination of free mercury and of combined mercuric mercury, determination of ash.

843. MIXED PAINTS, ENAMELS, ENAMEL PAINT, AND JAPAN

843.1 FLAT FINISH PAINT

U. S. Gov., Federal Specifications Board TT–P–41; 1931. Interior Lithopone Paint. White and Light Tints, Flat and Eggshell Finish. For pigment, requirements on percentages of lithopone, soluble matter, and tinting matter, for semipaste and for ready mixed paint, required percentages of pigment, liquid, water, coarse particles and skins, composition and nonvolatile matter in liquid, methods of sampling and test.

References.—Painting practice, safety codes, definitions, colors, methods of testing. *See also* 840.1–840.5.

843.2 GLOSS FINISH PAINT

U. S. Gov., Federal Specifications Board TT–P–46; 1931. Gloss Interior Lithopone Paint, White and Light Tints. Frequently known as gloss mill white for use on wood, metal, and plaster and to stand washing with soap and water. For pigment, requirements on content of lithopone, zinc oxide, tinting and extending pigments, soluble matter, and content of zinc sulphide in lithopone, for paint, requirements on content of pigment, liquid, nonvolatile matter, water, coarse particles and skins, methods of sampling and test.

References.—Painting practice, safety codes, definitions, colors, methods of testing. *See also* 840.1–840.5.

843.3 ENAMELS AND ENAMEL PAINTS

843.31 Black and Gray Enamel

U. S. Gov., Federal Specifications Board TT–E–521; 1930. Pigmented Black Enamel, Air Drying and Baking. For air drying type and for baking type, requirements on materials used and general quality of enamel, on weight, percentage of coarse particles and of nonvolatile matter, time of drying or baking, toughness, draft and gas test for safety, methods of testing, for outdoor general use.

References.—Painting practice, safety codes, definitions, methods of testing. *See also* 840.1–840.5. Elasticity tests of enamel on electric rigid conduit. *See* 715.11.

843.32 Brown Enamel

843.33 Cream Enamel

843.34 Green Enamel

843.35 Olive Enamel

843.36 Red and Maroon Enamels

U. S. Gov., Federal Specifications Board TT–E–531; 1931. Water-Resisting Red Enamel. For outside use, made from toluidine red toner and water-resisting long oil spar varnish, requirements on weight, content of pigment, permissible coarse particles and skins, content of nonvolatile matter, time of set and drying, working properties, water resistance, and toughness, methods of sampling and test.

References.—Painting practice, safety codes, definitions, colors, methods of testing. *See also* 840.1–840.5.

843.37 White Enamels

843.38 Yellow Enamels

843.39 Miscellaneous Enamels and Enamel Paints

References.—Tests of enamel on magnet wire. *See* 715.44. Elasticity tests of enamel on electric rigid conduit. *See* 715.11.

843.4 JAPAN PAINTS

843.5 WHITEWASH AND CALCIMINE

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 27, Government Whitewash. Formula 28, Whitewash. Required constituents and amounts of each, methods of preparation, former using unslaked lime and latter using slaked lime.

National Lime Assn. Whitewash and Cold Water Paints; 1929. Compilation of several formulas for whitewash, preparation of surfaces, preparation and application of wash, coverage, for sheds, poles, for buildings, signs, bunkhouses, and field offices, for safety zones and traffic guide lines, for basements and plaster surfaces, for a sizing paint, for rust prevention, for a disinfectant or insecticidal whitewash, for germicidal wash, for tree protection, preparation of dry batch.

References.—Lime. *See* 517.2.

843.6 LEAD PAINTS, MIXED

843.61 Red-Lead Paints

U. S. Gov., Dept. of Commerce, Bureau of Standards LC 81; 1922. Paint for Use on Railroad Track Scales. A red lead paint for levers and structural steel parts, requirements on mix proportions for 6 different formulas of red paint or brown paint mixed with red lead paste, or dry red lead, lamp black, linseed oil, turpentine, drier, with purity requirements for red lead and lamp black, recommended formulas for the various coats.

References.—Red lead pigments, lampblack. *See also* 842.63, 842.4. Linseed oil, turpentine. *See* 848.1, 848.7. Painting practice, safety codes, definitions, colors, methods of testing. *See also* 840.1–840.5.

843.62 White-Lead Paints

References.—White lead pigments. *See* 842.64, 842.87.

843.7 GRAPHITE PAINTS

843.8 IRON OXIDE PAINTS

U. S. Gov., Federal Specifications Board TT–P–31; 1931. Iron Oxide and Iron Hydroxide Paints. For pigment, requirements on percentages of ferric oxide, insoluble siliceous matter, and loss on ignition, freedom from organic colors, for semipaste and ready mixed paint, percentages of pigment, linseed oil, drier and thinner, moisture, coarse particles and skins, methods of sampling and test.

References.—Iron oxide pigments. *See also* 841.41. Linseed oil, turpentine. *See* 848.1, 211.1. Painting practice, safety codes, definitions, colors, methods of testing. *See* 840.1–840.5.

844. MIXED PAINTS AND PROTECTIVE COMPOUNDS, NOT ELSEWHERE CLASSIFIED

844.1 ANTIFOULING AND METAL-PROTECTING PAINTS AND COMPOUNDS

American Society for Testing Materials. D 277–31; 1931. The Toxic Ingredients in Antifouling Paints. Required amounts of cuprous oxide and mercuric oxide per gallon of paint for temperate and tropical waters, fineness and oxide content requirements for the cuprous oxide powder and the mercuric oxide powder, ash and purity requirements for mercuric oxide powder.

U. S. Gov., Federal Specifications Board 239; 1924. Heavy Rust Preventive Compound. For heavy or semisolid type that can be applied by brushing, dipping or spraying, requirements on general quality, melting point, homogeneity, absence of abrasives, stability, noncorrosive, adhesive, and protecting qualities, methods of test.

References.—Methods of analysis of cuprous oxide and mercuric oxide. *See* 842.9. Linseed oil, turpentine. *See* 848.1, 211.1. Painting practice, safety codes, definitions, colors, methods of testing. *See* 840.1–840.5.

844.2 BUILDING PAINTS NOT ELSEWHERE CLASSIFIED

844.3 FIELD-COAT PAINTS

National Electric Light Assn. Suggested Specifications D75–28T; 1928. Tentative. Pole Paint. For summer pole paint and for winter pole paint, requirements on general quality, purity and fineness of pigment, general quality of oil and dryer, thinner in accordance with F. S. B. specifications No. 16, permissible amounts of water, required amounts of pigment, thinner, oil and dryer solids, drying time.

References.—Paint pigments. *See also* 841, 842. Linseed oil, turpentine. *See* 848.1, 211.1. Painting practice, safety codes, definitions, colors, methods of testing. *See* 840.1–840.5.

844.4 PRIMING PAINTS

National Electric Light Assn. Suggested Specifications D70–28T; 1928. Tentative. Primer Pole Paint. Requirements on general properties of paint, purity and fineness of pigment, general quality of oil and dryer, thinner in accordance with Government specifications, permissible amount of water, required amounts of pigment, volatile thinner, raw linseed oil and dryer solids, drying time.

References.—*See* references under 844.3.

844.5 STENCIL PAINTS

844.6 PAINTS CLASSIFIED BY COLOR ONLY

844.61 Black and Gray Paints

American Railway Assn., Mechanical Div., Recommended Practice; 1922. Black Paint. A semipaste paint for use as a protective or finishing paint on freight cars, requirements on the composition of the semipaste and of the pigment.

U. S. Gov., Federal Specifications Board TT–P–61; 1931. Black Paint, Semipaste and Ready Mixed. For pigment, requirements on percentages of carbon, lead oxide, etc., for paste and paint, percentages of pigment, linseed oil, driers and thinners, moisture, coarse particles and skins, methods of sampling and test.

References.—Black pigment. *See also* 842.4. Linseed oil, turpentine. *See* 848.1, 211.1. Painting practice, safety codes, definitions, methods of testing. *See* 840.1—840.5.

844.62 Blue Paints

References.—White-lead and zinc-oxide paint. *See* 844.67.

844.63 Brown Paints

844.64 Buff, Drab, and Slate Paints

844.65 Green and Olive Paints

U. S. Gov., Federal Specifications Board TT–P–81; 1931. Olive Drab Paint (Semipaste and Ready-Mixed). Requirements on percentages of white lead, zinc oxide and white mineral pigments in paint pigment, on proportions of pigment, linseed oil, moisture, and coarse particles in semipaste and ready-mixed paint, methods of test.

U. S. Gov., Federal Specifications Board TT–P–71; 1930. Green Paints, Ready Mixed and Semipaste. For the pigment, requirements on composition, percentages of color, acid soluble CaO, barium sulphate, insoluble materials, and coarse particles. For the semipaste and ready mixed paint, requirements on content of pigment, linseed oil, volatile matter, and coarse particles, weight of paint, methods of testing.

References.—Lead pigments, zinc pigments. *See also* 842.6, 842.7. Linseed oil, turpentine. *See* 848.1, 211.1. Painting practice, safety codes, definitions, colors, methods of testing. *See* 840.1–840.5.

844.66 Red Paints

References.—Red lead pigments. *See* 843.61. Red enamel. *See* 843.36.

844.67 White Paints

American Assn. of State Highway Officials. Tentative Standard Specifications M–35; Undated. White Traffic Zone Paint, Ready Mixed, for Brick and Bituminous Pavements. Requirements on general quality, time of drying, percentages of pigment and vehicle, composition of vehicle and of pigment, drying qualities of vehicle.

American Assn. of State Highway Officials. Tentative Standard Specifications M–35; Undated. White Traffic Zone Paint, Ready Mixed, for Concrete Pavements. Requirements on general quality, color, night visibility, time of drying, percentages of pigment and of vehicle, composition of pigment and of vehicle, drying quality of vehicle.

U. S. Gov., Federal Specifications Board TT–P–101; 1931. Outside White Titanium-Zinc Paint, Semipaste and Ready-Mixed. For use where sulphide fumes discolor ordinary paint, requirements on chemical composition of pigment, proportions of pigment, linseed oil, moisture, coarse particles and skins in semipaste and in ready mixed paint, methods of sampling and test.

U. S. Gov., Federal Specifications Board TT–P–36; 1930. Lead-Zinc Base Paints, White and Tinted, Ready-Mixed and Semipaste. Requirements on percentages of white lead, zinc oxide, and other pigments and tinting colors in pigment, on quality of linseed oil, on percentages of pigment, liquid, linseed oil, moisture, coarse particles and skins in semipaste and ready-mixed paints, methods of testing.

References.—Titanium pigments, white lead pigments, zinc pigments. *See* 842.1, 842.64, 842.7. Linseed oil, turpentine. *See* 848.1, 211.1. Painting practice, safety codes, definitions, colors, methods of testing. *See* 840.1–840.5.

844.68 Yellow, Cream, and Straw Paints

844.69 Miscellaneous Paints Classified by Color

References.—Tinted paints on white base. *See* 844.67.

844.9 MISCELLANEOUS PAINTS

American Engineering Council. Street Traffic Signs, Signals and Markings; 1930. Submitted to American Standards Assn. for approval. Street Traffic Signs. Includes recommended specifications for paints for traffic signs. Formula for white pigment and paint, yellow pigment and paint, black pigment and paint, green pigment and paint, and red water-resisting enamel.

References.—Painting practice, safety codes, definitions, colors, methods of testing. *See* 840.1–840.5.

845. STAINS

845.1 SHINGLE STAINS

845.2 WOOD STAINS IN TURPENTINE

845.3 WOOD STAINS IN OIL

846. VARNISH AND VARNISH GUMS AND RESINS

846.0 GENERAL ITEMS

American Society for Testing Materials D 56–21; 1921. Approved by American Standards Assn. as K 8–1923. Method of Test for Flash Point of Volatile Flammable Liquids. For liquids flashing below 175° F. except fuel oils for which A. S. T. M. method D 93 is preferred, dimensions of Tag closed tester, dimensions, graduation and accuracy for thermometer, test procedure.

American Society for Testing Materials D 154–28; 1928. Methods of Testing Oleo-Resinous Varnishes. Preparation of color solutions and color test procedure, test procedure for nonvolatile matter, for elasticity or toughness by Run Kauri reduction or addition of linseed oil, for viscosity, and for water test, flash point test according to A. S. T. M. method D 56.

U. S. Gov., Dept. of Commerce, Bureau of Standards, T232; 1923. Shellac. Includes modification of McIlhiney method for the detection and estimation of adulterants in dry shellac and shellac varnish, suggested method of rating samples of shellac on basis of purity, method for determination of material insoluble in hot alcohol, and for determination of nonvolatile matter in shellac varnish. Methods differ from Am. Soc. Testing Materials methods.

References.—Methods of testing electrical insulating varnishes. *See* 719.57.

846.1 SPIRIT VARNISHES

846.11 Shellac Varnishes

American Bleached Shellac Mfrs. Assn. and United States Shellac Importers Assn. (Inc.). Methods of Analysis; 1929. Includes specifications for orange shellac, seed lac, and dry-bleached shellac, properties and composition, methods of analysis and solutions required for making determinations of rosin, melting point, matter insoluble in hot alcohol and in cold alcohol, wax, matter soluble in water, moisture, ash, arsenic, and of arsenic sulphide, testing of shellac varnish for color, volatile matter, insoluble matter, wax, purity, and drying time.

American Society for Testing Materials. Tentative Methods D 29–29T; 1929. Methods of Sampling and Testing Shellac. Methods of sampling orange shellac and bleached shellac, apparatus and test procedure for determination of matter insoluble in alcohol, iodine number, purity, moisture, wax, matter soluble in water, ash and color for various kinds of shellac and for shellac varnish.

U. S. Gov., Dept. of Commerce, Bureau of Standards T232; 1923. Shellac. Suggested specification for pure orange shellac varnish, requirements on percentage of nonvolatile matter, purity of alcohol, permissible percentage of residue soluble in petroleum ether and of residue insoluble in alcohol using modified McIlhiney test, negative test for rosin, test methods.

U. S. Gov., Federal Specifications Board TT–V–91; 1931. Shellac Varnish. Requirements on iodine number, content of matter insoluble in hot alcohol, permissible wax and ash for types 1 and 2 of each of orange shellac and bleached shellac, minimum allowable percentage of nonvolatile matter in light body, medium body, and heavy body varnish, methods of sampling and test.

References.—Methods of testing varnishes. *See also* 846.0. Shellac gum, alcohol. *See also* 846.62, 822.3 and 822.4. Safety codes, definitions, colors. *See also* 840.2–840.4.

846.12 Damar Varnishes

846.2 LONG OIL VARNISHES

846.21 Spar Varnish

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads, Forest Road Construction; 1929. Spar varnish for mixing with aluminum powder for making aluminum paint for painting steel bridges, requirements on transparency, percentage of nonvolatile oils and gums, toughness by Kauri reduction test, setting, spreading qualities, and viscosity, methods of test.

U. S. Gov., Federal Specifications Board TT–V–121; 1931. Water Resisting Spar Varnish. Requirements on appearance, color, flash point, percentage of nonvolatile matter, time of set and drying, viscosity, working properties, draft test, water resistance, toughness, methods of sampling and test.

References.—Aluminum powder. *See* 847.1. Methods of testing varnishes. *See also* 846.0. Safety codes, definitions, colors. *See also* 840.2–840.4.

846.29 Miscellaneous Waterproof Varnishes

References.—Insulating varnish for electrical wire. *See* 719.57.

846.3 SHORT OIL VARNISHES

846.31 Rubbing Varnish

References.—Interior varnish, rubbing quality. *See* 846.32.

846.32 Interior Varnishes except Floor Varnish

U. S. Gov., Federal Specifications Board TT–V–71; 1931. Interior Varnish. For general interior use, both rubbed and unrubbed, and for floors, requirements on appearance, color, flash point, nonvolatile matter, time to set and dry, toughness, working properties, water resistance test, methods of testing.

References.—Methods of testing varnishes. *See also* 846.0. Safety codes, definitions, colors. *See* 840.2–840.4.

846.33 Floor Varnishes

References.—Interior varnish for floors. *See also* 846.32.

846.4 ASPHALT VARNISHES

846.41 Air Drying Asphalt Varnish

U. S. Gov., Federal Specifications Board TT–V–51; 1931. Asphalt Varnish. Requirements on appearance, color, flash point, mixing quality with linseed oil, percentages of matter insoluble in carbon disulphide, nonvolatile matter, and fatty matter, time to set and dry, toughness, working properties, resistances to water, oil, and mineral acids, methods of sampling and test. Covers two grades, of which one is resistant to mineral acids.

References.—Methods of testing varnishes. *See also* 846.0. Linseed oil. *See* 848.1. Safety codes, definitions, colors. *See* 840.2–840.4.

846.42 Baking Asphalt Varnish

846.5 CELLULOSE ACETATE AND CELLULOSE NITRATE PRODUCTS

American Chemical Society. Journal of Industrial and Engineering Chemistry; Jan. 15, 1929.

Determination of Alpha-Cellulose. Tentative method for preparation and conditioning of sample and for test procedure.

American Chemical Society. Journal of Industrial and Engineering Chemisty; Jan., 1929. Tentative Standard. Method for Determining the Viscosity of Cellulose in Cuprammonium Hydroxide; 1927. Method of sampling, description of apparatus, standard test procedure.

American Society for Testing Materials. Tentative Specifications. D 301–31T; 1931. Soluble Nitrocellulose. Dimensions of recommended test tubes, reaction bulbs, etc., test requirements for ash, nitrogen, stability, consistency, solubility and appearance, film test, and toluol dilution test.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 49. Waterproof (Nonblush) Lacquer. Using base of nitrocellulose or collodion, required constituents and amounts of each, used for restoring the lacquer protective finish of cleaned metal cloth.

Pyroxylin Plastics Mfrs. Assn. Standards for Sheets, Rods, and Tubes; 1931. A limited list of standard sizes and thicknesses of sheets with tolerances on thickness, standard lengths, permissible variations in diameters and wall thicknesses for cut rods, stuffed rods, and stuffed tubing for fountain pens and other uses, tolerances on outside diameters of optical rim, oval, and other tubing.

References.—Soluble guncotton for medicinal purposes. *See* 862. Amyl alcohol, butyl alcohol, for use with cellulose ester coatings. *See* 822.1, 822.2. Butyl propionate, ethyl acetate, ethyl lactate, normal butyl acetate, for use with cellulose ester coatings. *See* 839.9. Methods of testing lacquer solvents and diluents. *See* 839.9. Methods of testing varnishes. *See also* 846.0. Safety codes. definitions, colors, methods of testing pigments in lacquer. *See* 840.2–840.5. Storage provisions and requirements for pyroxylin plastic and of motion picture film. *See* 518.50. Pyroxylin impregnated shade cloth. *See* 392.22. Methods of testing nitrocellulose clear lacquers and lacquer enamels. *See* 840.5. Cotton fabrics for pyroxylin coating. *See* 304.71.

846.6 VARNISH GUMS AND RESINS

846.61 Ester Gum

846.62 Shellac

American Bleached Shellac Mfrs. Assn. (Inc.). Standard Specifications for Bleached Shellac; 1929. Maximum insoluble matter, iodine number, moisture, wax, soluble matter and ash specified for regular and refined grades.

U. S. Gov., Dept. of Commerce, Bureau of Standards T232; 1923. Shellac. Suggested specification for pure orange shellac, using modified McIlhiney test method, permissible percentage of residue soluble in petroleum ether and of residue insoluble in alcohol, requirement on negative test for rosin, description of test methods.

U. S. Gov., Federal Specifications Board TT–S–271; 1930. Orange Shellac. For flake shellac made from stick lac, requirements for 4 types as regards permissible iodine number, matter insoluble in hot alcohol, moisture and volatile matter, matter soluble in water, wax, and ash, methods of sampling and test.

United States Shellac Importers Assn. (Inc.) Rules and Regulations; 1929 as revised in 1930. Includes rules for sampling at port of arrival of sticklac, seedlac, shellac, garnetlac, and buttonlac, comparison of colors with standard types; permissible rosin, alcohol insoluble impurities, moisture, etc., for various grades beyond which price allowances must be made to buyer.

References.—Shellac varnishes. *See also* 846.11. Methods of testing shellac. *See also* 846.0, 846.11.

846.63 Resins and Resin Compounds

American Society for Testing Materials D 269–30; 1930. Method of Test for Determination of Toluol Insoluble Matter in Rosin. Treatment of sample and test procedure for determination of matter insoluble in toluol, chiefly sand, chips, dirt, and bark.

U. S. Gov., Dept. of Agriculture. Food, Drug, and Insecticide Administration. Misc. Cir. No. 22; 1924 and Supplements 1 to 5, incl.; 1929. The Naval Stores Act and Regulations for Its Enforcement. Rosin. Definitions of gum rosin and of wood rosin, type standards for 15 grades of rosin are in custody of Dept. of Agriculture, the use of which are mandatory in commercial transactions in rosin. Includes text of pertinent portions of act.

846.7 VARNISH FOR PRINTERS AND LITHOGRAPHERS

846.9 MISCELLANEOUS VARNISH SPECIFICATIONS

References.—Electrical insulating varnishes. *See* 719.57.

847. BRONZE POWDERS AND VEHICLE

847.1 ALUMINUM BRONZE

American Society for Testing Materials D 266–31; 1931. Aluminum Powder for Paints. Covers aluminum bronze powder produced by a stamping process. Purity, fineness, and leafing property requirements.

American Society for Testing Materials. D 306–31; 1931. Method of Test for Determination of Polishing Lubricant in Aluminum Powder for Paints (Aluminum Bronze Powder). Apparatus and test procedure.

U. S. Gov., Dept. of Agriculture. Bureau of Public Roads. Forest Road Construction; 1929. Aluminum Paint for steel bridges, requirements on percentages of aluminum powder and of spar varnish, on purity, leafing quality, sieve grade, and acetone extract of aluminum powder, on transparency, percentage of nonvolatile oils and gums, toughness, setting, spreading qualities, and viscosity of spar varnish, methods of test.

References.—Spar varnish for making aluminum paint. *See* 846.21. Methods of testing varnish. *See* 846.0. Safety codes, definitions, colors. *See* 840.2–840.4.

847.2 GOLD BRONZE

American Society for Testing Materials D 267–31; 1931. Gold Bronze Powder. Commonly known as gold bronze, pale gold bronze, and rich gold bronze, permissible percentage of polishing lubricant, fineness and leafing property requirements.

847.3 COPPER BRONZE

847.4 BRONZING LIQUID

References.—Spar varnish for making aluminum paint. *See* 846.21.

848. OILS AND THINNERS FOR PAINTS AND VARNISHES

848.0 GENERAL ITEMS

American Chemical Society. Standard Methods for the Sampling and Analysis of Commercial Fats and Oils; 1926. Published by American Oil Chemists Society. Applicable to raw oils used in varnish and paint industry, methods of sampling, apparatus and methods of determination of moisture, volatile matter, insoluble impurities, soluble mineral matter, fatty acids combined, free fatty acids, titer, saponification number, unsaponifiable matter, iodine number, melting point, softening point, slipping point, flow test, cloud test, bleach test, Reichert-Meissl and Polenske numbers, Kirschner value, indices of refraction, specific gravity, acetyl value, open-cup flash and fire test, standard color for commercial fat.

848.1 LINSEED OIL

848.11 Raw Linseed Oil

American Railway Assn. Mechanical Division, Recommended Practice; 1925. Linseed Oil, Raw. For use in paint. Requirements on loss on heating, specific gravity, acid number, saponification number, unsaponified matter, iodine number, and color, methods of test.

American Society for Testing Materials D 234–28; 1928. Raw Linseed Oil. Limiting values for specific gravity, acid number, unsaponifiable matter, saponification number, iodine number, loss on heating, color, and foots, reagents required and their preparation, methods of test.

U. S. Gov., Federal Specifications Board JJJ–O–336; 1931. Raw Linseed Oil. For normal iodine number and high iodine number types, requirements as to percentage foots, gravity, acid number, saponification number, unsaponifiable matter, iodine number, loss on heating, color, method of sampling, methods of test, preparation of reagents.

References.—Linseed oil for medical purposes. *See* 813.5. Methods of testing varnish and paint oils. *See also* 848.0. Methods of testing vegetable oils. *See also* 142.0.

848.12 Boiled Linseed Oil

American Railway Assn. Mechanical Division. Recommended Practice; 1925. Linseed Oil, Boiled. For use with paint. Loss on heating, specific gravity, acid number, saponification number, unsaponifiable matter, iodine number, amount of lead, manganese, and calcium oxides, and methods of test.

American Society for Testing Materials. Tentative Specifications D 260–28T; 1928. Boiled Linseed Oil. Preparation of reagents, test requirements for time of drying, specific gravity, acid number, saponification number, unsaponifiable matter, iodine number, loss on heating, ash, and lead, limiting values and percentages of above.

U. S. Gov., Federal Specifications Board JJJ–O–331; 1931. Boiled Linseed Oil. For kettle boiled and for quick process boiled linseed oil, requirements on time of drying, loss on heating, specific gravity, acid and saponification numbers, unsaponifiable matter, iodine number, percentage of ash and of lead, methods of sampling and test.

References.—Linseed oil for medical purposes. *See* 813.5. Methods of testing varnish and paint oils. *See also* 848.0. Methods of testing vegetable oils. *See also* 142.0.

848.2 CHINA WOOD OIL (TUNG OIL)

American Society for Testing Materials. Tentative Specifications D 12–25T; 1925. Raw Tung Oil. Preparation of reagents, sampling and test requirements for specific gravity, acid number, saponification number, unsaponifiable matter, refractive index, iodine number, and heating test, limiting values for above.

New York Produce Exchange. Rules of Transactions in Vegetable Oils, Waxes, and Fats; 1924. China Wood Oil. For commercially prime oil, requirements on permissible amount of impurities, on heat or coagulation test.

References.—Methods of testing. *See also* 848.0, 142.0.

848.3 SOYBEAN OIL

References.—Soybean oil. *See* 143.2.

848.4 PERILLA OIL

American Society for Testing Materials D 125–23; 1923. Perilla Oil, Raw or Refined. Preparation of reagents, percentages of and test requirements for foots, loss on heating, specific gravity, acid number, saponification number, iodine number, unsaponifiable matter, and color.

New York Produce Exchange. Rules of Transactions in Vegetable Oils, Waxes and Fats; 1924. Perilla Oil. For pure and filtered oil, allowable amount of water and impurities.

References.—Methods of testing. *See* 848.0, 142.0.

848.5 FISH OIL

References.—Cod liver oil. *See* 813.2.

848.6 TURPENTINE

References.—Turpentine. *See* 211.1.

848.7 TURPENTINE SUBSTITUTES, MINERAL SPIRITS

American Railway Assn. Mechanical Division. Recommended Practice; 1922. Mineral Spirits. A turpentine substitute for mixing in oil paints. Appearance, gravity, flashing point, distilling temperature range, residue, and lack of sulphur requirements and methods of test, for petroleum distillate.

American Society for Testing Materials. Tentative Specifications D 235–26T; 1926. Petroleum Spirits (Mineral Spirits). Apply only to petroleum distillates. Requirements for color, flash point, and distillation test in accordance with A. S. T. M. methods D 156, D 56, and D 86. respectively, test requirements for blackening and acidity.

U. S. Gov., Federal Specifications Board TT–T–291; 1931. Volatile Mineral Spirits for Thinning Paints. For a petroleum distillate, requirements on freedom from suspended matter and water, color, spot test, flash point, blackening of copper test, distillation range, acidity, methods of sampling and test.

U. S. Gov., Federal Specifications Board TT–T–271; 1931. Paint Thinner for Thinning Semipaste Paints when the Use of Straight Linseed Oil is not Justified. Requirements on freedom from suspended matter and sediment, color, odor, mixing qualities with linseed oil, drying, toughness, nonvolatile matter content, acid number, methods of sampling and test. Covers a composite vehicle which contains drying oil, drier, and volatile thinner in one liquid.

References.—Definitions, methods of testing. *See also* 502.2, 503.0.

848.9 MISCELLANEOUS OIL AND THINNER SPECIFICATIONS

American Railway Assn. Mechanical Division Recommended Practice; 1925. Paint Reducing Oil. At least 17 per cent is linseed oil. Composition, iodine number, unsaponifiable matter, drier, flash point of mineral spirits, thinning, drying and elasticity test requirements.

References.—Methods of testing. *See also* 848.0, 142.0, 502.2, 503.0.

849. MISCELLANEOUS MATERIALS RELATING TO PAINTS AND PRESERVATIVE COATINGS

849.1 PAINT DRYERS

849.11 Japan Dryers

American Railway Assn. Mechanical Division Recommended Practice; 1916. Japan Dryer. Drying, curdling, and residue test requirements.

849.19 Miscellaneous Paint Driers

American Railway Assn. Mechanical Division Recommended Practice; 1927. Liquid Paint Drier. Lead, manganese, or cobalt with a fatty oil, requirements for color, flash point, miscibility, elasticity, and drying.

U. S. Gov., Federal Specifications Board TT–D–651; 1931. Drier, Paint, Liquid. Covers type for general use and type for lead-free paint. Requirements on appearance, color, flash point, per cent of nonvolatile matter, composition of volatile matter, metallic lead in ash, action with linseed oil, drying properties, methods of sampling and testing.

References.—Methods of testing. *See* 848.0, 142.0, 502.2, 503.0.

849.2 WOOD FILLERS AND OTHER FILLING MATERIALS

References.—Priming paints. *See* 844.4.

849.3 PUTTY

American Society for Testing Materials. Tentative Specifications D 317–30T; 1930. Glazier's Putty. For whiting putty and for white lead whiting putty, requirements on manufacture, chemical composition of pigment, composition of putty as regards amount of pigment, linseed oil, moisture, alkalinity, coarse particles and skins, general quality.

U. S. Gov., Federal Specifications Board TT–P–791; 1931. Putty. For whiting putty and for white lead-whiting putty, requirements on composition of pigment, proportions of pigment, linseed oil, moisture, alkali, coarse particles and skins, methods of test. Approved as regards technical requirements by American Standards Assn. as A43–1930.

References.—White lead for putty. *See* 842.64. Ceramic whiting, calcium carbonate. *See* 546., 833.3. Linseed oil. *See* 848.1. Method of testing putty. *See* 840.5.

849.4 PAINT AND VARNISH REMOVERS

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 20, Paint Remover. Formula 31, Solvent for Paints, Varnishes, Etc. Formula 33, Solvent for Airplane Dope and High Grade Varnish. For each, list of required materials, required amount of each constituent.

849.5 GOLD LEAF

References.—Gold bronze powder. *See* 847.2.

849.6 WATERPROOFING COMPOUND FOR FABRICS

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 34. Waterproofing Compound for Garments. Of paraffin wax and scrap rubber, requirements on proportions of each and method of preparing mixture and its application to fabrics.

References.—Asphalt for waterproofing. *See* 505.16. Waterproofing of raincoats. *See* 392.54. Fabric waterproofed with asphalt. *See* 392.4. Varnished cloth and tape for electrical purposes. *See* 719.56. Spar varnish, electrical insulating varnish. *See* 846.21, 719.57.

849.7 WATER COLORS

849.8 METAL CEMENT PIGMENTS

849.9 MISCELLANEOUS MATERIALS RELATING TO PAINTS NOT ELSEWHERE CLASSIFIED

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 24, Stock Solution for Glove Coloring. Formula 25, Glove Color Stock. Formula 26, Light Tints in Glove Paste. Formula 35, Rhodamine Stock Solution for Tinting. Formula 38, To Color Talcum or Magnesium Carbonate Powders. Formula 41, Spot Dyeing Cloths. For each, required constituents and amount of each, preparation.

National Assn. Sheet Metal Contractors. Standard Practice in Sheet Metal Work; 1929. Section XII. Protective Coatings and Paints. Includes recommendations on coloring and oxidizing effects on copper, method of application of solutions and composition of solutions.

850–859 FERTILIZERS AND FERTILIZER MATERIALS

850. GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Definitions of Terms and Interpretation of Results on Fertilizers and Liming Materials. General definitions of acidulated fish tankage; acidulated fish scrap; activated sewage products; ammoniated superphosphate; ashes from leached wood; dissolved bone; dried, pulverized, or shredded manures; fish tankage, fish scrap, dry ground fish, fish meal, fertilizer grade; garbage tankage; ground raw bone; ground steamed bone; horn and hoof meal; leached wood ashes; manure salts; superphosphate; tankage; unit of plant food; unleached wood ashes; activity of water-insoluble nitrogen in fertilizers; amount of chlorine permissible in fertilizers in which the potash is claimed as sulfate; the term lime as applied to fertilizers, order of terms in mixed fertilizers.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Fertilizers. Official methods for sampling, preparation of sample and of reagents, determination of moisture, of total phosphoric acid, water-soluble and citrate-insoluble phosphoric acid, organic and ammoniacal nitrogen only, total nitrogen, nitric and ammoniacal nitrogen, water insoluble organic nitrogen, potash.

References.—Other definitions. See 851, 852, and 859.

851. NITROGENOUS FERTILIZER MATERIALS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Definitions of Terms for Fertilizers and Liming Materials. Crude, Inert, or Slow-Acting Nitrogenous Materials. Definition, limits on plant food value.

References.—Methods of analysis. *See* 850.

852. PHOSPHATE FERTILIZER MATERIALS (ROCK)

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Definitions of Terms for Fertilizers and Liming Materials, Basic Phosphate Slag. Definition, required amount of total phosphoric acid and of phosphoric acid soluble in 2 per cent citric acid solution.

U. S. Gov., Dept. of Commerce. Bureau of Standards, C25 and Suppl.; 1927. Standard Samples.

Phosphate Rock. Sample No. 56 prepared and sold by the bureau with a certificate giving percentage P_2O_5, Fe_2O_3, Al_2O_3, etc., for use by industrial organizations as a comparison standard for checking the accuracy of analysis of similar material, etc.

853. SUPERPHOSPHATES (ACID)

854. PREPARED FERTILIZER MIXTURES

References.—Methods of analysis. *See* 850.

859. MISCELLANEOUS FERTILIZER SPECIFICATIONS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Agricultural Liming Materials, Tentative Method. Sampling, preparation of sample and of reagents, procedure for determination of neutralizing value, caustic value, calcium oxide in burnt and hydrated lime, carbon dioxide, magnesium oxide, mechanical analysis of ground limestone.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Definitions of Terms for Fertilizers and Liming Materials. Dried Blood. Definition, required percentage of nitrogen.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Definitions of Terms for Fertilizers and Liming Materials. Kainit. Definition, required percentage of potash.

References.—Lime. *See also* 517.2. Muriate of potash. *See* 832.4. Nitrate of soda. *See* 834.2. Nitrate of potash, sulphate of potash, and sulphate of potash-magnesia. *See* 832.4.

860–869 EXPLOSIVES, FIREWORKS, AND AMMUNITION

860. GENERAL ITEMS

Mine Inspectors' Institute of America. Approved by American Standards Assn. as M14–1930. Use of Explosives in Bituminous Mines. Recommended practice on type and size of firing cable, handling and storing explosives on surface and underground, transportation, opening of cases, methods and precautions for charging holes and firing, including inspection.

U. S. Gov., Dept. of Commerce, Bureau of Mines, Schedule 1B; 1926. Procedure for Testing Explosives Used in Metal Mines, Tunnels, Quarries, and Other Engineering Operations. Test requirements for firing with electric detonator, for pendulum friction test, requirements on chemical stability and nonleakage of explosive, regulations for obtaining tests and fees.

U. S. Gov., Dept. of Commerce, Bureau of Mines, Schedule 17A; 1926. Procedure for Testing Explosives for Permissibility for Use in Coal Mines. Requirements on use with electric detonators, limited size of charge, permissible amount of poisonous gas evolved per charge, complete detonation, strength test, pendulum friction test, explosion tests in explosive gas mixtures, etc., fees.

U. S. Gov., Dept. of Commerce, Bureau of Mines. Schedule 20; 1928. Permissible Blasting Devices. For use in coal mines, prescribed conditions for use of device, test requirements as regards permissible amount of poisonous gases evolved, explosion tests in explosive gas mixtures, etc., how approvals are granted, etc.

References.—Storage of motion picture films. *See* 518.50.

861. POWDER

References.—Permissive explosives and blasting machines. *See* 860. Use of explosives in mines. *See* 860.

862. DYNAMITE AND OTHER HIGH EXPLOSIVES

Institute of Makers of Explosives, Pamphlet 15–B; 1929. Standardization of Sizes of Cartridges and Strengths of High Explosives. List of recommended standard cartridge sizes and standard strengths for high explosives of nitroglycerin, ammonia, and gelatin classes.

U. S. Pharmacopœial Convention (Inc.). Pharmacopœia of U. S. A.; 1926. Pyroxylin. (Soluble guncotton.) For medicinal purposes, physical properties, test requirements for identity and purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Nitroglycerine in tablets, medicinal. *See* 819.9. Cellulose acetate and nitrate products. *See* 846.5. Picric acid, medicinal. *See* 802.1. Metallic cartridges, loaded paper shot shells. *See* 619.1. Permissive explosives, recommended use of explosives in mines. *See* 860.

863. TRACK TORPEDOES AND FUSEES

American Railway Assn. Operating Div. Circular 2086; 1920. Five Minute Red Fusee. Construction, dimensions, and transverse strength test requirements for paper container tube, duration of burning in air and burning in water, resistance to high temperature, minimum ignition temperature, chemical composition limits.

American Railway Assn. Operating Div. Circular D–1–35; 1924. Standard Track Torpedoes. General design requirements, immersion in water test requirements, dimensions and material of devices for fastening to rail, amount of explosive, resistance to high temperature, and fineness requirements for abrasive materials.

870–879 SOAPS, COSMETICS AND TOILET PREPARATIONS

871. SOAPS

871.0 GENERAL ITEMS

American Chemical Society. Standard Methods for the Sampling and Analysis of Commercial Fats and Oils; 1926. Published by the American Oil Chemists Society. Applicable to fats and fatty oils used in the soap industry, methods of sampling, apparatus and methods of determination of moisture, volatile matter, insoluble impurities, soluble mineral matter, fatty acids combined, free fatty acids, titer, saponification number, unsaponifiable matter, melting point, iodine number, softening point, slipping point, flow test, cloud test, bleach test, Reichert-Meissel and Polenske numbers, Kirschner value, index of refraction, specific gravity, acetyl value, open-cup flash and fire test, standard color for commercial fat.

American Chemical Society. Standard Methods for the Analysis of Commercial Soaps and Soap Products. Published by Laundryowners National

Assn. in its Manual of Standard Practice for the Power Laundry Washroom, 1927 edition. Methods for the determination of volatile matter, matter insoluble in alcohol, total anhydrous soap, unsaponified matter, rosin, titer, acid number, borax, carbon dioxide, phosphates, sulphates, glycerin, sugar, starch, and volatile hydrocarbons.

American Oil Chemists' Society. Official Methods of Chemical Analysis; 1930. Includes soap stock and acidulated soap stock, methods for determination of total fatty acid and titer.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Soap. Official methods for determination of moisture, potassium and sodium.

National Cottonseed Products Assn. Rules; 1930. Rules 137 to 138. Soap Stock and Acidulated Soap Stock. For soap stock resulting from refining of vegetable oil, requirements on content of fatty acids for soap stock and for acidulated soap stock.

National Cottonseed Products Assn. Rules; 1930. Rules 243 and 276. Soap Stock and Acidulated Soap Stock. Methods of sampling, methods of chemical analysis for determination of total fatty acid including methods applicable to copra and palm kernel oil.

871.1 TOILET SOAPS

871.11 Castile Soap

U. S. Pharmacopœial Convention (Inc.). Pharmacopœia of U. S. A.; 1926. Olive Oil Castile Soap. Physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Olive oil. *See* 813.6, 142.5. Soap stock, methods of testing soap and soap stock. *See also* 871.0.

871.12 Liquid Toilet Soap

American Hotel Assn. Hotel Soaps and Cleaning Compounds, Including Standard Specifications for Purchasing; 1923. Includes liquid soap, requirements on volatile matter, free alkali, solubility, odor, color, etc.

National School Supply Assn. Certified Janitor Supply Products; 1930. Liquid hand soap. Soap content requirements for 3 grades of liquid soap.

U. S. Gov., Federal Specifications Board P–S–618; 1930. Liquid Toilet Soap. Approved by American Standards Assn. as K14–1930 with Nat. Bureau of Standards as sponsor. For a soap of pure vegetable oil potash (or potash and soda) with or without glycerol or alcohol, requirements on general quality, percentage of anhydrous soap, matter insoluble in alcohol, free alkali, chloride, sulphates, and sugar, methods of test.

References.—Soap stock, vegetable oils. *See* 871.0, 142. Methods of testing soap and soap stock. *See also* 871.0.

871.13 Milled Toilet Soap

American Hotel Assn. Hotel Soaps and Cleaning Compounds, Including Standard Specifications for Purchasing; 1923. Includes milled toilet soap, requirements on volatile matter, free alkali, solubility, odor, color, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards C62; 1923. Specifications for and Methods of Testing Soaps. Includes proposed specifications for milled toilet soap, requirements on content of volatile matter, free alkali, insoluble matter, sodium chloride, unsaponified matter, with sampling and testing methods.

U. S. Gov., Federal Specifications Board P–S–621; 1930. Milled Toilet Soap. Requirements on general quality, permissible volatile matter, free alkali, insoluble matter, sodium chloride, and unsaponified saponifiable matter, methods of inspection and test.

References.—Soap stock, vegetable oils. *See* 871.0, 142. Methods of testing soap and soap stock. *See also* 871.0.

871.14 Shaving Soap

871.15 White Floating Soap

American Hotel Assn. Hotel Soaps and Cleaning Compounds, Including Standard Specifications for Purchasing; 1923. Includes white floating soap, requirements on volatile matter, free alkali, solubility, odor, color, etc.

U. S. Gov., Federal Specifications Board P–S–616; 1930. White Floating Toilet Soap. For a cake soap equal to one made from soda and a mixture of tallow and coconut oil, requirements on floating, content of volatile matter, free alkali, matter insoluble in alcohol and in water, chloride, rosin, sugar, and foreign matter, acid number of prepared fatty acids, methods of sampling and testing.

References.—Soft soap. *See* 871.3. Soap stock, vegetable oils. *See* 871.0, 142. Methods of testing soap and soap stock. *See also* 871.0.

871.19 Miscellaneous Toilet Soaps

U. S. Gov., Federal Specifications Board P–S–576; 1930. Hand Grit Soap. For a high grade soap of about one-third weight in siliceous matter, requirements on percentage of siliceous material, fineness of siliceous material, permissible volatile matter, alkaline salts, free alkali, rosin, sugar, and foreign matter, required soap content, methods of sampling and test.

References.—Soap stock, vegetable oils. *See* 871.0, 142. Methods of testing soap stock and soap. *See also* 871.0.

871.2 LAUNDRY AND KITCHEN SOAP, CHIPS, AND POWDER

871.21 Ordinary Laundry and Kitchen Soap

American Hotel Assn. Hotel Soaps and Cleaning Compounds, Including Standard Specifications for Purchasing; 1923. Includes laundry soap, requirements on volatile matter, free alkali, solubility, odor, color, etc.

Laundryowners National Assn. Laundry Supplies. Undated. Soap. For a neutral, or 88 per cent soap, requirements on percentage of total soap, moisture, free caustic, soda ash, rosin, titer of fatty acid.

U. S. Gov., Dept. of Commerce, Bureau of Standards C62; 1923. Specifications for and Methods of Testing Soaps. Includes proposed specifications for hard water grade laundry soap, requirements on content of volatile matter, free alkali, insoluble matter, sodium chloride, required acid number of fatty acids, sampling and testing methods.

U. S. Gov., Dept. of Commerce, Bureau of Standards C62; 1923. Specifications for and Methods of Testing Soaps. Includes proposed specifications for special grade laundry soap, for use with soft water, requirements on content of volatile matter, free alkali, sodium chloride, insoluble matter, and rosin, methods of sampling and test.

U. S. Gov., Federal Specifications Board P–S–591; 1931. Laundry Soap, Ordinary. Requirements on general composition, odor, volatile matter, free alkali, matter insoluble in alcohol and in water, and rosin content, methods of test.

References.—Soda ash. *See* 834.4, 834.7. Caustic soda, caustic potash. *See* 834.8, 832.3. Soap stock, methods of testing soap and soap stock. *See also* 871.0.

871.22 Soap Chips

American Hotel Assn. Hotel Soaps and Cleaning Compounds, Including Standard Specifications for Purchasing; 1923. Includes chip soap, requirements on volatile matter, free alkali, solubility, odor, color, etc.

U. S. Gov., Federal Specifications Board P–S–566; 1930. Chip Soap. For soap in chip form made of soda and fats, requirements on general quality, permissible volatile matter, free alkali, matter insoluble in alcohol, chloride, matter insoluble in water, titer of fatty acid; methods of sampling and test.

References.—Soda ash. *See* 834.4, 834.7. Caustic soda, caustic potash. *See* 834.8, 832.3. Soap stock, methods of testing soap and soap stock. *See also* 871.0.

871.23 Soap Powders

American Hotel Assn. Hotel Soaps and Cleaning Compounds, Including Standard Specifications for Purchasing; 1923. Includes soap powder, requirements for volatile matter, free alkali, solubility, odor, color, etc.

U. S. Gov., Federal Specifications Board O–T–671; 1930. Trisodium Phosphate, Technical (Phosphate Cleaner). Granulated product used for cleaning typewriter parts, floors, metals, etc., where abrasive action is not desired, requirements on alkalinity, percentage of phosphoric anhydride, insoluble matter, and sieve grading, methods of sampling and test.

U. S. Gov., Federal Specifications Board P–S–596; 1930. Powdered Soap for Laundry Use. Requirements on general quality, permissible volatile matter, free alkali, insoluble matter, and sodium chloride, titer of fatty acids, required fineness, methods of test.

U. S. Gov., Federal Specifications Board P–S–606; 1930. Soap Powder. For soap and sodium carbonate in powdered form, requirements on percentage of soap, and of sodium carbonate, methods of sampling and test.

References.—Soda ash. *See* 834.4, 834.7. Caustic soda, caustic potash. *See* 834.8, 832.3. Soap stock, methods of testing soap and soap stock. *See also* 871.0. Metal polishes. *See* 891. Scouring powders. *See also* 871.27.

871.24 Liquid Laundry Soap

National Assn. of Dyers and Cleaners. Tech. Bulletin 1; 1929. Strong Soap Solution. For use in cleaning, requirements on preparation of strong soap solution from benzine soap and solvent, directions for use.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Includes soap formulas. No. 4 Soapbark (Quillai Bark), No. 7 Benzine Soap, No. 9 Naphtha Soap. Requirements on kinds and quantities of constituents, preparation of the soaps.

U. S. Gov., Federal Specifications Board P–S–586; 1930. Liquid Soap for Laundry Uses. For a solution of pure potash soap with or without glycerol or alcohol, requirements on content of volatile organic solvent, general quality, content of anhydrous soap, permissible matter insoluble in alcohol and insoluble in water, permissible free alkali and chloride, washing test, methods of sampling and test.

References.—Soda ash. *See* 834.4, 834.7. Caustic soda, caustic potash. *See* 834.8, 832.3. Soap stock, methods of testing soap and soap stock. *See also* 871.0. Metal polishes. *See* 891.

871.25 Laundry Sours

Laundryowners National Assn. Laundry Supplies. Undated. Laundry Sours. For acetic acid a 58 per cent strength recommended, for oxalic acid a commercial grade of oxalic acid crystals is recommended.

References.—Acetic acid, oxalic acid. *See also* 821.1, 831.6.

871.26 Scouring Soaps

American Hotel Assn. Hotel Soaps and Cleaning Compounds, Including Standard Specifications for Purchasing; 1923. Includes grit soap, requirements on volatile matter, free alkali, solubility, odor, color, etc.

National School Supply Assn. Certified Janitor Supply Products; 1930. Scrubbing Soap. For a jelly soap and for a liquid scrubbing soap, requirements on soap content, neutrality, made from vegetable oils saponified with potash.

U. S. Gov., Federal Specifications Board P–S–571; 1930. Grit Cake Soap. For 2 types, one for fine work as glass and enamel and other for scouring and scrubbing, requirements on percentage of insoluble siliceous material, composition and fineness of siliceous material, percentage of soda soap, permissible volatile matter, alkali, rosin, sugar and foreign material, nonscratching quality, method of sampling and test.

References.—Soda ash. *See* 834.4, 834.7. Caustic soda, caustic potash. *See* 834.8, 832.3. Soap stock, methods of testing soap and soap stock. *See also* 871.0. Metal polishes. *See* 891. Scouring powders. See 871.27.

871.27 Scouring Powders

American Hotel Assn. Hotel Soaps and Cleaning Compounds, Including Standard Specifications for Purchasing; 1923. Includes scouring compounds, requirements for volatile matter, free alkali, solubility, odor, color, etc.

U. S. Gov., Federal Specifications Board P–P–591; 1930. Scouring Powder for Floors. For 3 types, for fine marble floors, for tile or ceramic floors, and soap scouring compound, requirements on percentage of volatile matter, of sodium carbonate and anhydrous soap, of free alkali, of insoluble siliceous matter, required fineness of siliceous material, color of powder, lack of scratching, methods of sampling and test.

References.—Soda ash. *See* 834.4, 834.7. Caustic soda, caustic potash. *See* 834.8, 832.3. Soap stock, methods of testing soap and soap stock. *See also* 871.0. Other laundry soap powders. *See* 871.23. Metal polishes. *See* 891.

871.29 Miscellaneous Specifications for Laundry and Kitchen Soaps

American Bottlers of Carbonated Beverages. Educ. Bull. No. 4; 1930. Bottle Washing Compound. Prescribes the minimum allowed percentage of sodium hydrate (caustic).

References.—Caustic soda, lye. *See* 834.8.

871.3 SOAPS FOR MEDICINAL AND SURGICAL USE

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Olive Oil Castile Soap. Physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Soft Soap. Composition, preparation, physical properties, test requirements for purity. Recognized as standard in enforcement of Federal food and drugs act.

References.—Soap stock, vegetable oils. *See* 871.0, 142. Methods of testing soap and soap stock. *See also* 871.0.

871.4 AUTOMOBILE SOAP

U. S. Gov., Federal Specifications Board P–S–561; 1930. Automobile Soap. For a pure vegetable oil paste soap containing no free alkali or acid, permissible volatile matter, free alkali and matter insoluble in alcohol, free acid, matter insoluble in water, unsaponified matter, and rosin, methods of sampling and test.

References.—Soap stock, vegetable oils. *See* 871.0, 142. Methods of testing soap and soap stock. *See also* 871.0. Metal polishes. *See* 891.

871.5 SALT-WATER SOAP

U. S. Gov., Federal Specifications Board P–S–611; 1930. Salt Water Soap. For soap made from pure coconut oil, pure palm kernel oil, and alkali, requirements on solubility in sea water and fresh water, content of volatile matter, matter insoluble in alcohol and water, free alkali, chloride, rosin, sugar, and foreign matter, required acid number of prepared fatty acid, methods of sampling and test.

References.—Soap stock, vegetable oils. *See* 871.0, 142. Methods of testing soap and soap stock. *See also* 871.0. Soda ash, caustic soda, caustic potash. *See* 834.4, 834.8, 832.3.

871.6 HARNESS SOAP

References.—Leather dressings and cleaner. *See* 891.

871.7 DRY-CLEANING SOAP

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 6, Alcoholic Benzene Soap for Hand Brushing. Formula 8, White Dry-cleaning Soap. Formula 29, Glove Cleaning Soap. Formula 30, Bleaching Soap to Spot Fruit, Iodine, or Ink Stains from Fabric. Formula 48, Hand Brushing Soap. Required constituents and amounts of each, methods of preparation.

References.—Dry-cleaning solvent. *See also* 503.2. Bleaches. *See* 891.

872. TOILET PREPARATIONS

872.0 GENERAL ITEMS

U. S. Gov., Treasury Dept., Bureau of Prohibition, Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Toilet, Medicinal, and antiseptic preparations. For such materials in which alcohol is a part, the regulations require the addition of given amounts of any of 6 modifying agents in order to be classed as nonbeverage.

872.1 TALCUM POWDER

U. S. Pharmacopoeial Convention (Inc.). Parmacopoeia of U. S. A.; 1926. Purified Talc. For medical use as a filtering medium, composition, physical properties, identity tests, test requirements, grade size for filtering purposes. Recognized as standard in enforcement of Federal food and drugs act.

872.2 TOOTH PASTE AND TOOTH POWDER

American Pharmaceutical Assn., National Formulary; 1926. Dentifrice. An oxidizing tooth powder for medicinal purposes, formula giving amounts and kinds of ingredients, method of preparation, various formulas for various flavors. Recognized as standard in enforcement of Federal food and drugs act.

880–889 DISINFECTANTS AND WATER TREATMENTS

881. DISINFECTANTS AND INSECTICIDES

881.0 GENERAL ITEMS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Official methods for sampling, preparation of reagents, determination of total arsenic, water-soluble arsenic, lead oxide, copper, zinc oxide, fluorine, covers general methods.

U. S. Gov., Congress, 36 Stat., 331; 1910. The insecticide act of 1910. For insecticides and fungicides, requirements by law regarding stating on label the percentage of total arsenic, of water-soluble forms of arsenic, and of inert substances.

U. S. Gov., Dept. of Agriculture, Food, Drug, and Insecticide Administration, S. R. A., C. P. No. 1, Rev. 1; 1929 and S. R. A., C. P. No. 2; 1928. Regulations for the Enforcement of the Caustic Poison Act. Regulations on labeling of dangerous caustic or corrosive substances used in household, includes providing the common name, the word poison, and antidote, list of substances and their strengths covered by act, list of acceptable antidotes.

U. S. Gov., Dept. of Agriculture, Food, Drug, and Insecticide Administration, S. R. A., I. F. No. 1; 1928. Regulations for Enforcement of the Insecticide Act of 1910. Regulations regarding sampling and examination of materials, on misbranding and adulteration, false statements, form of guaranty, etc. Includes text of act.

U. S. Gov., Dept. of Commerce, Bureau of Standards R41; 1926. Package Sizes for Insecticides and Fungicides. Simplified practice recommended and accepted by industry establishing a limited number of standard package sizes for arsenate of lead, calcium arsenate, paris green, and bordeaux mixture, sizes according to pounds capacity.

U. S. Gov., Treasury Dept., Bureau of Prohibition, Regulation 2; 1927. Relating to Permits for the Manufacture of and Traffic in Intoxicating Liquors for Nonbeverage Purposes. Toilet, medicinal, and antiseptic preparations. For such materials in which alcohol is a part, the regulations require the addition of given amounts of any of 6 modifying agents in order to be classed as nonbeverages.

881.1 INSECT STOMACH POISONS

881.11 Arsenate and Arsenite of Lead

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Lead Arsenate. Official methods for determination of moisture, total arsenic, total arsenious oxide, arsenic oxide, water-soluble arsenic, total lead oxide.

U. S. Gov., Congress, 36 Stat., 331; 1910. The Insecticide Act of 1910. Lead Arsenate. Definition, requirements fixed by law for permissible percentage of water, permissible total arsenic and arsenic in water-soluble form, disallowance of mixing in other material that affects quality and strength, requirements on labeling and branding.

References.—Package sizes. *See* 881.0.

881.12 Arsenate and Arsenite of Lime

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Calcium Arsenate. Official methods for determination of moisture, total arsenic, total arsenious oxide, water-soluble arsenic, total calcium oxide.

References.—Labeling requirements, package sizes. *See* 881.0.

881.13 Arsenate and Arsenite of Soda

881.14 Hellebore (Plant Root)

881.15 Paris Green, Schlee's Green, London Purple

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. London Purple. Official methods for determination of moisture, total arsenic, total arsenious oxide, total arsenic oxide, water-soluble arsenious oxide, water-soluble arsenic oxide.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Paris Green. Official methods for determination of moisture, total arsenic, total arsenious oxide, sodium acetate-soluble and water-soluble arsenious oxide, total copper oxide.

U. S. Gov., Congress, 36 Stat., 331; 1910. The Insecticide Act of 1910. Paris Green. Definition, requirements fixed by law for percentage of arsenious oxide, permissible arsenic, disallowance of other material that affects quality and strength of the paris green, requirements on labeling and branding.

References.—Package sizes. *See* 881.0.

881.16 Poisoned Grain

881.17 Powders for Dusting

U. S. Gov., Federal Specifications Board O–S–601; 1930. Sodium Fluoride, Insecticide. A powder suitable for dusting, requirements on general physical quality, content of sodium fluoride, permissible impurities, methods of sampling and test.

References.—Methods of testing, labeling requirements. *See also* 881.0.

881.18 White Arsenic (Arsenic Trioxide)

References.—Methods of testing, labeling requirements. *See* 881.0. Arsenic trioxide for medicinal purposes. *See* 814.2. Arsenic trioxide as chemical reagent. *See* 839.9.

881.19 Miscellaneous Insect Stomach Poisons

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Magnesium Arsenate. Official methods for determination of moisture, total arsenic, total arsenious oxide, water-soluble arsenic.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Zinc Arsenite. Official methods for determination of moisture, total arsenic, total arsenious oxide, water-soluble arsenic, total zinc oxide.

References.—Labeling requirements. *See* 881.0.

881.2 CONTACT INSECTICIDES

881.21 Sulphur Insecticides

Agricultural Insecticide and Fungicide Mfrs. Assn. Lime Sulphur Solution; 1928. Requirements on density of solution and percentage of calcium polysulphide.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Lime-Sulphur Solutions. Official methods for determination of total sulphur, thiosulphate sulphur, sulphide sulphur, sulphate sulphur, total lime, tentative method for determining monosulphide equivalent.

881.22 Soap and Oil Sprays

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Mineral Oil and Soap Emulsions. Methods for determination of water, total oil, soap, unsulphonated residue, and ash.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Mineral Oils. Method for determination of unsulphonated residue.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Soap. Official methods for determination of moisture, potassium and sodium.

881.23 Bordeaux Mixture

Agricultural Insecticide and Fungicide Mfrs. Assn. The Bulletin, No. 5; 1926. Bordeaux Mixture. Allowable metallic copper content and tolerance.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Bordeaux Mixture. Official methods for determination of moisture, carbon dioxide, and copper.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Bordeaux Mixture with Lead Arsenate. Bordeaux Mixture with Calcium Arsenate. Official methods for determination of moisture, carbon dioxide, total arsenic, water-soluble arsenic, copper, lead oxide.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Bordeaux Mixture with Paris Green. Official methods for determination of moisture, carbon dioxide, total arsenic, total arsenious oxide, water-soluble arsenious oxide, and copper.

References.—Labeling requirements, package sizes. *See* 881.0.

881.24 Nicotine Insecticides

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Tobacco and Tobacco Extract. Official methods for determination of nicotine.

References.—Labeling requirements. *See* 881.0. Tobacco. *See* 261.

881.25 Mercuric Chloride

References.—Mercuric chloride. *See* 839.36.

881.26 Insect Powder (Pyrethrum)

U. S. Gov., Federal Specifications Board O–P–571; 1930. Insect Powder (Pyrethrum Powder). Requirements on permissible species of chrysanthemum from which obtained, permissible flower stems and of ash insoluble in hydrochloric acid, methods of test.

References.—Sodium fluoride, insect powder. *See* 834.9. Labeling requirements. *See* 881.0.

881.27 Flour Paste

881.28 Naphthalene

References.—Naphthalene for medicinal purposes. *See* 801.4.

881.3 FUMIGANTS

881.31 Hydrocyanic Acid Gas

881.32 Carbon Disulphid

References.—Carbon disulphide as a reagent for chemical analysis. *See* 839.6.

881.33 Sulphuric Acid

References.—Sulphuric acid. *See* 821.7.

881.34 Sodium Cyanide

References.—Sodium cyanide, insecticide. *See* 834.1. Labeling requirements. *See* 881.0.

881.35 Sodium Fluoride

References.—Sodium fluoride, insect powder. *See* 834.9. Labeling requirements. *See* 881.0.

881.4 CAUSTIC WASHES FOR BORERS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Formaldehyde Solutions. Official methods for determination of formaldehyde.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Soda Lye. Official methods for determination of carbonate and hydroxide.

References.—Formaldehyde solution. *See* 881.9. Labeling requirements. *See* 881.0.

881.5 DISINFECTANTS FOR BUILDINGS

National School Supply Assn. Certified Janitor Supply Products; 1930. Disinfectants. For a pine disinfectant and for a coal tar disinfectant, requirements on phenol coefficient.

References.—Fumigants. *See also* 881.3. Carbolic acid. *See also* 802.1.

881.9 MISCELLANEOUS DISINFECTANTS AND INSECTICIDES

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Copper Carbonate. Official method for determination of copper oxide.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Insecticides and Fungicides. Organic Mercurial Seed Disinfectants. Methods for the determination of mercury.

References.—Labeling requirements. *See* 881.0.

882. WATER TREATMENTS, SEWAGE TREATMENTS

882.0 GENERAL ITEMS

American Public Health Assn. and American Water Works Assn. Standard Methods of Water Analysis; 1925. Published by A. P. H. A. Includes examination of sewage, industrial wastes, sewage sludge and muds, sampling, determination of nitrogen, oxygen, relative stability, biochemical oxygen demand, solids, grease, iron, etc., microscopical and bacteriological examination of water.

American Public Health Assn. and American Water Works Assn. Standard Methods of Water Analysis; 1925. Published by A. P. H. A. Includes methods of measurement and analysis and preparation of standards for physical and chemical examination of water, including turbidity, color, odor, nitrogen, oxygen, suspended matter, hardness, alkalinity, acidity, metallic elements, etc., microscopical and bacteriological examination methods.

American Railway Engineering Assn. 1929. Manual. Water Service and Sanitation. Standard Method of Water Analysis and Interpretation of Results; 1924. Applicable to boiler waters, standard combinations of chemical constituents used in reporting results and their classification into incrustants, nonincrustants and corrosives, analysis procedure and reagents for field survey and rapid laboratory analysis. For complete laboratory examination the standard method of water analysis of the American Public Health Assn. is recommended.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Waters, Brine, and Salt. Industrial Water. Determination of solids in solution, chlorine, combined carbonic and bicarbonic acids, nitrates, silica, iron, aluminum, calcium, magnesium, sulfuric acid, alkalinity before and after boiling, total hardness and permanent hardness.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Waters, Brine, and Salt. Irrigating Water. Determination of solids in solution, chlorine, carbonic and bicarbonic acids, sulphuric acid, calcium, magnesium, and black alkali.

882.1 ANTIFOAMING BOILER COMPOUND

References.—Boiler compounds. *See* 882.2.

882.2 ANTISCALE BOILER COMPOUND

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Hydrated Lime to be Used in Water Treatment; 1922. For high calcium and calcium classes, sampling, chemical composition and fineness requirements.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Quicklime to be Used in Water Treatment; 1922. For high calcium and calcium classes and for selected and run-of-kiln grades, sampling and chemical composition requirements.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Soda Ash to Be Used in Water Treatment; 1922. For light soda ash, sampling, minimum percentage of sodium carbonate, fineness requirement.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Sulphate of Alumina to be Used in Water Treatment; 1922. For basic sulphate of alumina, sampling and chemical composition requirements.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Sulphate of Iron to be Used in Water Treatment; 1922. For grade (a), prime green, selects, or stick crystals, or for grade (c), granular or sugar sulphate of iron, both of ferrous sulphate, sampling and chemical composition requirements.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 17. Boiler Compound. Requirements on proportions of glaubers salt, soda ash, slippery elm, sumac and water, preparation and use.

References.—Methods of water analysis. *See* 882.0. Other specifications for lime, for soda ash. *See* 517.2, 834.4.

882.3 DRINKING WATER AND TREATMENT OF DRINKING WATER

American Society for Testing Materials C 53–27; 1927. Quicklime for Use in Water Treatment. For treatment of public water supplies, general quality requirements, required percentage of available lime using A. S. T. M. test method C 25–27T.

American Society for Testing Materials C 54–27; 1927. Hydrated Lime for Use in Water Treatment. For use in treatment of public water supplies, required percentage of available lime using A. S. T. M. test method C 25–27T.

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis; 1930. Waters, Brine, and Salt. For potable water, determination of turbidity, color, odor, solids in solution and suspended, nitrogen as ammonia, nitrite, and nitrate, chlorine, oxygen required, dissolved oxygen, tentative methods for lead, copper, and zinc.

U. S. Gov., Treasury Dept. U. S. Public Health Service. Reprint No. 1029; 1925. Drinking Water Standards. Mandatory for drinking and culinary water supplied by common carriers in interstate commerce. Requirements on freedom of the water source from sanitary defects, on percentage of samples of water showing presence of B. coli group, on general physical and chemical characteristics.

References.—Methods of water analysis. *See also* 882.0.

882.4 WATER FOR CHEMICAL AND MEDICINAL PURPOSES

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Water. Distilled Water. For medicinal purposes, description and physical properties, test requirements for purity. Recognized as standards in enforcement of Federal food and drugs act.

References.—Methods of water analysis. *See also* 882.0. Chemicals used in water purification. *See* 517.2, 833.2, 834.4, 834.8, 838.3, 839.33. 839.34, 839.8.

890–899 MISCELLANEOUS CHEMICAL PRODUCTS

891. BLEACHES, POLISHES, DRESSINGS

Laundryowners National Assn. Laundry Supplies. Undated. Bleach. Recommended percentage of available chlorine in chloride of lime.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 12. Chloride of Lime Bleach (Eau de Javelle. bleaching powder). Requirements on method of preparation, constituents and amounts of each.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 13, Dressing for Leather Goods and Furniture. Formula 14, Black for Leather. Formula 15, High Gloss Black for Leather. Formula 39, Leather Dressing. Formula 40, Leather Cleaner. List of required materials and amounts of each, methods of preparation.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 21, Preparation of Hydrogen Peroxide from Perborate of Soda. Formula 22, Preparation of Hydrogen Peroxide from Sodium Peroxide. Requirements on kinds and amounts of constituents, directions for preparation.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 23. Bisulphite Bleach. For sodium bisulphite bleach, requirements on amounts of prescribed materials for preparation of 3 grades of bleach.

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 32. Bleach to Follow Permanganate Spotting. For use in cleaning garments, requirements on proportions of hydrogen peroxide and acetic acid.

U. S. Gov., Federal Specifications Board 340; 1925. Polishing Paste. For polishing of metals, requirements on general qualities, freedom from acid, cyanides, and ingredients injurious to metals, nonscratching or tarnishing qualities, methods of test.

U. S. Gov., Federal Specifications Board 390; 1926. Silver Polish. For liquid, paste, and powder, requirements on composition, freedom from acids and cyanides, fineness of abrasives, general quality, methods of test.

U. S. Gov., Federal Specifications Board 558; 1928. Trisodium Phosphate, Technical (Phosphate Cleaner). Granulated product used for cleaning typewriter parts, floors, metals, etc., where abrasive action is not desired, requirements on alkalinity, percentage of phosphoric anhydride, insoluble matter, and sieve grading, methods of sampling and test.

892. PRESERVATIVES AND ARTIFICIAL SWEETENERS FOR FOODS

Assn. of Official Agricultural Chemists. Official and Tentative Methods of Analysis 1930. Preservatives and Artificial Sweeteners. Methods for determination of presence and amount of salicyclic acid, of benzoic acid, saccharin, boric acid, for presence of formaldehyde, of soluble and insoluble fluorides, of beta-naphthol, of abrastol, of sucrol or dulcin, of presence and amount of sulphurous or formic acids.

References.—Salicylic acid, benzoic acid. *See* 812.1. Formaldehyde. *See* 824. Insoluble fluorides, soluble fluorides, saccharin, abrastol, sucrol, dulcin. *See* 839.9.

900–999 COMMODITIES NOT ELSEWHERE CLASSIFIED

910–919 SCIENTIFIC AND PROFESSIONAL APPARATUS AND SUPPLIES

910. GENERAL ITEMS

American Institute of Electrical Engineers. (Standard No. 17f; 1928.) Joint sponsor with American Assn. for Advancement of Science, American Society of Civil Engineers, American Society of Mechanical Engineers, and Society for Promotion of Engineering Education. Approved by American Standards Assn. as Z 10f–1928. Mathematical Symbols. List of standard mathematical letter symbols.

American Society of Mechanical Engineers. Navigational and Topographical Symbols. Approved by American Standards Assn. as Z10h–1930. Sponsor bodies, Am. Assn. for Advancement of Science, Am. Inst. of Electrical Engrs., Am. Soc. of Civil Engrs., Am. Soc. Mech. Engrs., and Soc. for Promotion of Engineering Education. Cover symbols for map making purposes, for works and structures, boundaries, monuments, drainage, relief, land classification, hydrography, obstructions, aids to navigation, aerial navigation symbols.

American Standards Assn. Z17–1927. Preferred Numbers. Informally approved and recommended to industry for trial in practice, tables of preferred numbers for use in size standardization with definite relations between the numbers in each of 4 standard series.

911. PHOTOGRAPHIC GOODS

911.1 CAMERAS

Society of Motion Picture Engineers. Dimensional Standards; 1930. Approved by American Standards Assn. as Z22–1930. For motion picture cameras, standard dimensions of 16 mm camera aperture, taking speed for 35 mm sound pictures, recommended practice on camera cranking speed for standard film, width of film track for 16 mm camera.

References.—Sound recording and reproducing equipment. *See* 718.7. Testing of lenses. *See* 914.0.

911.2 FILMS AND PLATES

Society of Motion Picture Engineers. Dimensional Standards; 1930. Approved by American Standards Assn. as Z22–1930. For motion picture film, standard dimensions of newly cut and perforated film for 35 mm, 28 mm, and 16 mm negative and positive film, location of frame line, making of splices, relative position of scanning line for combined sound and picture on 35 mm film, recommended practice on leaders and trailers.

Society of Motion Picture Engineers. Dimensional Standards; 1930. Approved by American Standards Assn. as Z22–1930. Safety Film. Definition of safety motion picture film, as regards burning time and construction.

References.—Shipping containers for film. *See* 954.21, 958.3. Storage of motion picture film. *See* 518.50. Cellulose acetate and cellulose nitrate products. *See* 846.5.

911.3 PHOTOGRAPHIC PAPER

References.—Standard sizes of photographic paper. *See* 478.34.

911.9 MISCELLANEOUS PHOTOGRAPHIC GOODS

References.—Metol. *See* 809.3. Sodium carbonate for photographic purposes. *See* 834.4. Anhydrous sodium sulphate for photography. *See* 834.9. Preservers or storage envelopes for negatives. *See* 494.

912. PROJECTION APPARATUS

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931; 1931. Motion Picture Projectors and Equipment. Requirements on inclosure of live parts, grounding, thickness of metal in arc light housing, minimum wire sizes, general construction of film magazines and automatic shutters, requirements for fireproof projector room, sizes of vent pipes and fans, storage and rewinding of films.

Society of Motion Picture Engineers. Dimensional Standards; 1930. Approved by American Standards Assn. as Z22–1930. For projectors, standard dimensions of lantern slide mat openings, for motion picture projectors, standard dimensions of take-up, intermittent and feed sprockets, dimensions of projection aperture, external dimensions of projection lenses, projection speed for sound pictures, recommended practice on size of observation port, projection lens height, projection angle, projector speed, projector apertures for sound-on-film practice. Dimensions of sprockets, aperture, and width of film track for 16 mm projectors.

U. S. Gov., Federal Specifications Board. G–M–111; 1931. Lantern Slide Mats. For mats made of opaque paper, requirements on standard dimensions, composition of paper, thickness of mat, finish, sharp cutting of openings.

References.—Booths for projectors. *See* 518.54. Storage of motion picture films. *See* 518.50. Sound recording and reproducing equipment. *See* 718.7. Testing of lenses. *See* 914.0. Motion picture films. *See* 911.2.

914. OPTICAL GOODS

914.0 GENERAL ITEMS

Optical Society of America, vol. 6, Aug. 1922, of Journal of Optical Society of Am. Report of Committee on Colorimetry for 1920–21. Includes curves showing elementary color excitations for different wave lengths for an equal energy spectrum. Research Paper No. 163 of U. S. Bureau of Standards, entitled Reduction of Data on Mixture of Color Stimuli, includes data on the distributions of the O. S. A. excitations throughout the spectrum of Abbot-Priest sunlight.

U. S. Gov., Dept. of Commerce, Bureau of Standards C27; 1918. Properties and Testing of Optical Instruments. Description of test methods and list of tests which the bureau will make on demand with fees charged, for instruments such as spectacle lenses, field glasses, telescopes, etc., for single lenses, for compound lenses, such as photographic objectives, etc.

914.1 LENSES (NOT FITTED TO INSTRUMENTS)

References.—Railway signal lenses, automobile headlamp lenses. *See* 525.3, 525.4.

914.2 BINOCULARS AND TELESCOPES

References.—Standard tests and methods of testing. *See* 914.0.

914.3 MICROSCOPES

914.4 READING GLASSES

References.—Standard tests and methods of testing. *See* 914.0.

914.5 EYE AND FACE SHIELDS AND GOGGLES

U. S. Gov., Dept. of Commerce, Bureau of Standards H2; 1922. Approved by American Standards Assn. as X 2–1922. National Safety Code for the Protection of the Heads and Eyes of Industrial Workers. Protectors for oxy-acetylene welding, furnace work, electric arc welding and cutting, etc. For helmets and shields, requirements on properties of the materials used, scope of protection, dimensions of windows, radiant energy transmission.

U. S. Gov., Dept. of Commerce, Bureau of Standards H2; 1922. Approved by American Standards Assn. as X 2–1922. National Safety Code for the Protection of the Heads and Eyes of Industrial Workers. Protectors for oxy-acetylene welding, furnace work, etc. Goggles, face masks, helmets, and shields are permitted, requirements on fiber face masks regarding shape, size of window, general quality of glass in lenses and cover glasses, permissible radiant energy transmission of lenses.

U. S. Gov., Dept. of Commerce, Bureau of Standards H2; 1922. Approved by American Standards Assn. as X 2–1922. National Safety Code for the Protection of the Heads and Eyes of Industrial Workers. Protectors for oxy-acetylene welding, furnace work, etc. For 3 permissible styles of goggles, requirements on materials and structural features, general quality of glass and radiant energy transmission permissible for lenses.

U. S. Gov., Dept. of Commerce, Bureau of Standards H2; 1922. Approved by American Standards Assn. as X 2–1922. National Safety Code for the Protection of the Heads and Eyes of Industrial Workers. Protectors for exposure to glare. For 3 permissible styles of goggles, permissible transmission of total radiant energy and of short wave length radiant energy.

U. S. Gov., Dept. of Commerce, Bureau of Standards H2; 1922. Approved by American Standards Assn. as X 2–1922. National Safety Code for the Protection of the Heads and Eyes of Industrial Workers. Protectors for Handling Corrosive Chemicals, Dipping, Brush Coating, Etc. For face masks, eyecup goggles, and hoods, permissible materials and general structural features of face masks and goggles, dimensions and light transmission requirements for lenses.

U. S. Gov., Dept. of Commerce, Bureau of Standards H2; 1922. Approved by American Standards Assn. as X 2–1922. National Safety Code for the Protection of the Heads and Eyes of Industrial Workers. Protectors for babbitting, etc. For a face mask and goggles of three permissible styles, requirements on size of openings for woven wire masks, structural features and materials of goggle frames, dimensions, thickness, and required light transmission of lenses.

U. S. Gov., Dept. of Commerce, Bureau of Standards H2; 1922. Approved by American Standards Assn. as X 2–1922. National Safety Code for the Protection of the Heads and Eyes of Industrial Workers. Protectors for exposure to dust and wind, etc. For 3 permissible styles of goggles, requirements on transmission of light, general structural features and materials.

U. S. Gov., Dept. of Commerce, Bureau of Standards H2; 1922. Approved by American Standards Assn. as X 2–1922. National Safety Code for the Protection of the Heads and Eyes of Industrial Workers. Protectors for scaling, grinding, etc. For 2 permissible styles of goggles, requirements on transmission of visible light, general features and materials of construction.

U. S. Gov., Dept. of Commerce, Bureau of Standards H2; 1922. Approved by American Standards Assn. as X 2–1922. National Safety Code for the Protection of the Heads and Eyes of Industrial Workers. Protectors for chippers, riveters, calkers, etc. Includes goggles, face masks, and helmets, requirements on general quality and size of glass goggles, percentage transmission of light, drop test for lenses, structural features of 2 permissible types of goggles, strength and corrosion test of frames.

U. S. Gov., Dept. of Commerce, Bureau of Standards H2; 1922. Approved by American Standards Assn. as X 2–1922. National Safety Code for the Protection of the Heads and Eyes of Industrial Workers. Protectors for sandblasting. For hood, requirements on size and effectiveness, size of openings in metal screen in window.

U. S. Gov., Federal Specifications Board 542; 1927. Rubber Frame Goggles. For single piece flexible type, requirements on size and general structural features, composition of rubber compound, optical qualities of lenses, dimensions of lenses, sterilization test, hot water test for lenses, methods of test with rubber tested according to F. S. B. Spec. 59 for rubber goods. Used as protection against dust and harmful liquids.

U. S. Gov., Federal Specifications Board 543; 1927. Welders' Goggles. For eyecup type, metal construction with flexible nose bridge, requirements on general structural features and dimensions, general quality of lenses and cover glasses, radiant energy transmission for visible, infra-red, and ultra-violet for 4 shade numbers of lenses, dimensions of lenses and cover glasses, transmission of light by cover glass, sterilization and corrosion resistance test, methods of test, 2 shades of lenses intended for glare from snow, etc., other 2 shades intended for gas cutting and arc welding up to 30 amperes.

U. S. Gov., Federal Specifications Board 544; 1927. Welders' Helmets. Requirements on general structural features of body, window container, and headgear, general quality and dimensions of windows and cover glasses, radiant energy transmission requirements for 4 shade numbers of windows, including ultra-violet, visible, and infra-red, sterilization test, test methods, types of welding to which shade is applicable.

U. S. Gov., Federal Specifications Board, 545; 1927. Babbitting Masks. Of steel wire gauze type equipped with windows and leather apron, requirements on general qualities, finish, size of gauze, shaping of body of mask, provision of adjustable headgear, size of apron, location of window containers, size, quality, and optical transmission characteristics of windows, sterilization tests of masks, optical and hot water test requirements for windows.

U. S. Gov., Federal Specifications Board 546; 1927. Helmets, Sand-blasting. Type suitable for external air supply, general requirements for materials, design and construction of leather or canvas helmet, window containers, air supply and windows, dimensions of windows, air hose, and cover screens, sterilization test, optical test, and dyed material test requirements.

U. S. Gov., Federal Specifications Board GGG–G–501; 1930. Chippers' Eyecup Goggles. Requirements on construction, materials, and some dimensions of headband, eyecups, lens container, and nose bridge, dimensions, optical properties, and transmission test for lenses, test requirements for sterilization, corrosion, optical properties, and resistance to drop test.

U. S. Gov., Federal Specifications Board GGG–G–541; 1930. Welders' Goggles. For eyecup type goggles, permissible materials, requirements on design and construction, dimensions of lenses and goggle parts, sterilization test, corrosion resistance test, requirements on quality, radiant energy transmission, and hot water test for 5 shades of filter lenses and for cover glasses, methods of test.

U. S. Gov., Federal Specifications Board GGG–H–191; 1930. Welders' Helmets. Single window, head supported, tiltable type for protecting face, head, and neck. Permissible materials, design and construction requirements for body of helmet, window container, and head gear, quality, dimensions, and radiant energy transmission requirements for 7 shades of filter glasses and for cover glass, sterilization and hot water test for helmet and glasses, methods of testing.

U. S. Gov., Federal Specifications Board GGG–S–311; 1930. Welders' Hand Shields. For rectangular and oval types, requirements on design, construction, and dimensions of nonconducting shield and handle, radiant energy transmission tests for filter and cover glasses, quality and dimensions of filter and cover glasses, for 7 filter shades, sterilization tests, methods of testing.

References.—Gas masks. *See* 993. Oxygen breathing apparatus. *See* 993. Methods of testing rubber goods. *See also* 200. Methods of analysis and standard samples of glass. *See* 520.

914.6 LOVIBOND GLASSES

U. S. Gov., Dept. of Commerce, Bureau of Standards S547; 1927. Lovibond Color System. A Spectrophotometric Analysis of the Lovibond Glasses. An analysis of the particular set of Lovibond glasses belonging to the bureau showing the relation between the transmission at given wave lengths and the Lovibond number to be used as a basis in an attempt to standardize the Lovibond glasses used in color analysis of vegetable oils.

914.9 MISCELLANEOUS OPTICAL GOODS

References.—Marine sextants. *See* 916.22.

915. DENTAL, SURGICAL, AND MEDICAL EQUIPMENT AND SUPPLIES

915.0 GENERAL ITEMS

American College of Surgeons. Manual of Hospital Standardization; 1930. Minimum requirements as to provision of a staff, eligibility to staff, staff rules for hospital, complete records, diagnostic and therapeutic facilities.

915.1 DENTAL EQUIPMENT AND SUPPLIES

915.10 General Items

American Dental Trade Assn. Primer of simplified practice for the dental trade; 1927. Limited number of sizes and grades chosen as standard, including color of equipment, grinding wheels, bridge cement shades, investment containers, gold shells, brush and felt and chamois wheels, gold and vulcanite files.

U. S. Gov., Dept. of Commerce, Bureau of Standards R108–29; 1929. Dental Hypodermic Needles. Simplified practice recommended and accepted by industry for a limited standard schedule for stock varieties of dental hypodermic needles, including hexagonal hub with standard thread, American Luer standard slip hub, conductive anesthesia with hexagonal hub and slip hub, cartridge type needles and Schimmel and other needles.

U. S. Gov., Dept. of Commerce, Bureau of Standards. R116–30; 1930. Dental Brush Wheels. And R130–31; 1931. Dental Lathe Grinding Wheels. Simplified practice recommended and accepted by industry establishing a limited list of stock varieties and sizes of brush wheels (R116–30), and grinding wheels (R130–31).

U. S. Gov., Dept. of Commerce, Bureau of Standards, R117–30; 1930. Packaging of Dental Plaster, Investment and Artificial Stones. Simplified practice recommended and accepted by industry establishing a limited list of standard package sizes as determined by net weight for investments and artificial stones, for plaster, and for separating plaster.

915.11 Dental Instruments

References.—Standard sizes and grades. *See* 915.10.

915.12 Dental Alloys

References.—Dental gold alloys. *See* 662. Dental amalgam alloys. *See* 691.1.

915.13 Dental Rubber Goods

References.—Rubber dam. *See* 204.4.

915.14 Dental Films

915.19 Miscellaneous Dental Supplies

American Dental Assn. Tentative Specification. No. 3, 1930. Dental Impression Compounds. Published in Vol. XVIII of Journal of Am. Dental Assn. for Jan. 1931. Requirements on freedom from foreign materials, uniformity of grain, glossy surface, trimming qualities, hardening point, plasticity, softening point, working range, and shrinkage, methods of test.

American Dental Assn. Tentative Specification. No. 4, 1930. Dental Inlay Casting Wax. Published in Vol. XVIII of Journal of Am. Dental Assn. for Jan. 1931. For waxes of paraffin series, requirements on freedom from foreign material, color, softening qualities, trimming qualities, melting and vaporizing qualities, flow at mouth temperatures, softening point, working range, thermal expansion, methods of test.

References.—Calcined gypsum for use in preparation of dental plasters. *See* 514.2.

915.2 SURGICAL AND MEDICAL INSTRUMENTS

915.21 Bougies

915.22 Catheters

References.—Catheters. *See* 204.55.

915.23 Depressors

915.24 Mirrors

915.25 Sphygmomanometers

U. S. Gov., Dept. of Commerce, Bureau of Standards T352. Use and Testing of Sphygmomanometers. Includes methods of testing against a standard instrument, tolerances allowed for mercurial and for aneroid instruments, standard required for issuance of certificate for instruments tested.

915.26 Stethoscopes

915.27 Syringes and Needles

References.—Dental hypodermic needle sizes and varieties. *See* 915.10. Rubber fountain syringe. *See* 204.26.

915.28 Wooden Applicator

915.29 Miscellaneous Surgical and Medical Instruments

References.—Clinical thermometers. *See* 919.83.

915.3 MEDICAL AND HOSPITAL EQUIPMENT

915.30 General Items

National Board of Fire Underwriters. Anaesthetical Apparatus Employing Combustible Anaesthetics; 1929. Precautions on use, marking and location of storage cylinders or cans, ventilation of room, use of explosion proof motors and vapor proof electric lamps, grounding of machines, tables, patients, and operators, provision of humid atmosphere, no open flames, smoking, etc.

915.31 Disinfectors, Inhalers, and Irrigators

915.32 Sterilizers

U. S. Gov., Federal Specifications Board 68a; 1925. Sterilizers, Dressing Containers, Etc. For dressing sterilizer of vacuum type, requirements on dimensions of 3 sizes, size of door, construction, materials of brass or copper, capacity of electric heater if used, capacity of vacuum device, time required to obtain sterilization, burner equipment and pressure test of heating coils where steam heat used.

U. S. Gov., Federal Specifications Board 68a; 1925. Sterilizers, Dressing Containers, Etc. For instrument sterilizers of sheet copper, requirements on dimensions of 6 sizes, thickness of metal, construction, door operating device, heating rate of electric heater where used, burner equipment and pressure test of heating coils where steam heat used.

U. S. Gov., Federal Specifications Board 68a; 1925. Sterilizers, Dressing Containers, Etc. For sheet copper utensil sterilizer, requirements on dimensions, thickness of material, construction, method of opening door, heating rate of electric heater if used, burner equipment and pressure test of heating coils where steam heat used, covers 2 sizes.

U. S. Gov., Federal Specifications Board 68a; 1925. Sterilizers, Dressing Containers, Etc. For water sterilizers, requirements on capacity and thickness of metal for 3 sizes, construction of sterilizer and of filter, pressure test of steam heating coils, burner equipment, required fittings.

References.—Electric heaters. *See also* 717.1.

915.33 Litters and Stretchers

915.34 Atomizers

915.35 Rubber Goods

References.—Rubber bandages, adhesive plaster. *See* 204.1. Rubber ice bags, hot water bottles, cushions, pillows and pillow cases, syringes, politzer bags. *See* 204.2. Rubber sheeting. *See* 204.33. Dental rubber dam. *See* 204.4. Rubber aprons, gloves, finger cots, operating pads, stomach and colon tubes, catheters. *See* 204.5. Rubber tubing for laboratory use. *See* 204.6. Rubber cement, stoppers, crutch tips. *See* 204.9.

915.36 Hospital Furniture

References.—Hospital and surgical beds and cots. *See* 613.1.

915.37 Bottles

References.—Blake tablet bottle sizes. *See* 955.1.

915.39 Miscellaneous Medical and Hospital Equipment

References.—Other hospital utensils. *See* 915.4. X-ray equipment and dosage measurement. *See* 717.3.

915.4 HOSPITAL UTENSILS

915.41 Basins

915.42 Cups, Pouches, and Holders.

915.43 Cabinets, Medicine Chests, and Equipment

American Marine Standards Committee. H No. 32–1928. Medical Chest for Ocean Going Vessels. Recommended kinds of wood and of ply construction, requirements on general quality of wood, construction of joints and of chest, kinds and amount of hardware, general layout and partitioning of drawers.

American Marine Standards Committee. H No. 33–1928. Medicine Chest for Coastwise and Lake Freighters. Dimensioned drawing of chest and partitioned tray and bottom, construction, finish, and hardware requirements, recommendations on types of wood for each portion of chest.

American Marine Standards Committee. H No. 34–1928. Medicine Chest for Small Vessels. Requirements on general design and main dimensions, construction of joints and of chest. kinds and general quality of wood, finish, type and amount of hardware.

References.—Sterilizers, dressing containers, and portable lockers. *See* 613.5, 915.32.

915.44 Funnels and Graduates

References.—Laboratory funnels and graduates. *See* 918.2.

915.45 Medicine Droppers and Glasses

915.46 Stands, Trays, and Carriers

915.47 Urinals, Bedpans, Commodes, and Racks

References.—Stationary urinals of vitreous ware. *See* 532.23.

915.5 MEDICAL AND HOSPITAL SUPPLIES

915.50 General Items

American Marine Standards Committee. O No. 21–1928. Medical and Surgical Supplies and Equipment for Ocean-Going Vessels. Standard unit list of vaccines and antitoxins, drugs and chemicals, surgical and general supplies and equipment.

American Marine Standards Committee. O No. 22–1928. Medical and Surgical Supplies for Coastwise and Lake Freighters. Standard Unit List. Lists of medical supplies for first aid kits, and of drugs and surgical and general medical supplies for medicine chest.

American Marine Standards Committee. O No. 23–1928. Medical and Surgical Supplies and Equipment for Small Vessels. Standard unit list of medicines, supplies and equipment, including first aid kits.

915.51 Surgical Dressings

References.—Absorbent cotton, gauze, surgical dressings. *See* 398.1, 398.2, 398.3.

915.52 First-Aid Supplies

References.—*See* references under 915.51.

915.53 Medicinal and Pharmaceutical Preparations

References.—Standard unit list of supplies. *See* 915.50. Medicinal and pharmaceutical preparations. *See* 810–819.

915.54 Napkins

915.55 Surgical Silk and Tape

References.—Adhesive tape. *See* adhesive plaster under 204.12.

915.56 Suture Material

U. S. Gov., Federal Specifications Board 357; 1925. Boilable Catgut Ligatures (Surgical Catgut Suture Material). For plain ligatures, 10 to 20 day chromicized, and 30 to 40 day chromicized ligatures, requirements on source, preparation, length, sizes, tensile strength, pliability, storage in tubes, sterilization, boilable properties, permissible ash, freedom from sulphates, preparation and absorbability of chromicized ligature, methods of test.

915.57 Absorbent Cotton

References.—Absorbent cotton. *See* 398.1.

915.58. Bone Plates

U. S. Gov., Dept. of Commerce. Bureau of Standards. CS37–31; 1931. Steel Bone Plates and Screws. A commercial standard selected and adopted by industry for Sherman type bone plates made of chromium-vanadium steel, requirements on chemical composition of plates and screws corresponding to S. A. E. steel No. 6150, hardness, dimensions and design for 14 plate sizes, and 11 screw sizes.

916. SURVEYORS' AND ENGINEERS' INSTRUMENTS AND SUPPLIES

916.1 MATHEMATICAL INSTRUMENTS

916.2 LENGTH AND ANGLE MEASURING INSTRUMENTS

916.21 Length-Measuring Instruments

U. S. Gov., Dept. of Commerce, Bureau of Standards C328; 1927. Testing of Measuring Tapes at the Bureau of Standards. Includes specifications for standard steel tapes, requirements on placing of graduations, permissible error in length for chosen standard tensions. Method of testing steel tapes with description of bench standard, description of geodetic comparator for testing base-line tapes.

References.—Caliper rules, carpenters folding rules, steel rules, wood rulers. *See* 616.33. Railway wheel measuring tapes. *See* 616.35. Standard linear measures. *See* 919.1.

916.22 Angle-Measuring Instruments

U. S. Gov., Dept. of Commerce, Bureau of Standards C110; 1921. Specifications for Marine Sextants. Used as the basis for certificates issued for instruments tested by the bureau. Covers requirements on rigidity, durability, convenience of operation, range and accuracy of scales, consistent tolerances for the mirrors, shade glasses, and telescopes.

916.4 GAUGES (EXCEPT INDUSTRIAL)

916.5 TRANSITS

916.6 LEVELS (OTHER THAN CARPENTER'S)

916.7 CHESTS AND KITS

916.8 PLANE-TABLE OUTFITS

917. METEOROLOGICAL INSTRUMENTS

917.1 ANEMOMETER AND WIND VANES

917.2 BAROMETERS AND BAROGRAPHS

American Society of Mechanical Engineers Power Test Code. Instruments and Apparatus Part 2. Pressure Measurements; 1929. Chap. 1 on description, explanation of use, installation and calibration of various types of barometers. Chap. 6 on standards of reference for rated vacuum or back pressure of turbines and engines, tables of corrections for barometers and mercury columns for temperature, differences in elevation, gravity, capillarity; tables of multipliers for water columns, formulas for pressure equivalents of velocity heads and for pressure loss due to pipe friction, pressure conversion tables.

U. S. Gov., Dept. of Commerce, Bureau of Standards C46; 1922. Testing of Barometers and Altimeters. For aneroid barometers, uses and errors, methods of test used at bureau covering the general test, the supplementary test for sample instruments, the supplementary test for experimental instruments, and the short test for service instruments, the general test including mechanical tests, sea-level corrections, and calibration, tolerances for aviation aneroid barometers and barographs, certification of tested instruments, fees.

U. S. Gov., Dept. of Commerce, Bureau of Standards C46; 1922. Testing of Barometers and Altimeters. For mercurial barometers, uses, errors, methods of test used at the bureau, giving of instrument corrections for instruments submitted for test.

917.3 PSYCHROMETERS, CASE AND SLING

917.4 GAUGES, METEOROLOGICAL

917.5 THERMOMETERS

References.—Testing of thermometers. *See* 919.80.

918. LABORATORY APPARATUS AND SUPPLIES

918.0 GENERAL ITEMS

American Ceramic Society, Journal of A. C. S. for June; 1928. Tentative Methods. Analysis of Glass; 1926. Preparation and fusion of sample, method of determination of silica, iron and alumina, lime, magnesia, and alkalis.

U. S. Gov., Dept. of Commerce, Bureau of Standards C19; 1924. Standard Density and Volumetric Tables. Includes tables of temperature correction for glass volumetric apparatus.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Glass. Sample No. 80 for soda-lime glass, No. 89 for lead-barium glass, No. 91 for opal glass, No. 92 for standard low boron glass, and No. 93 for standard high boron glass (Pyrex), sample prepared and sold by the bureau with a certificate of its analysis, for use by industrial organizations and others as a comparison standard in the analysis of glass.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS21–30; 1930. Interchangeable Ground Glass Joints. A commercial standard selected and accepted by industry applicable to ground glass joints for laboratory and industrial glassware, covering 1 standard taper, 9 standard diameters and lengths of ground zone, standard gages to be kept at Bureau of Standards.

U. S. Gov., Dept. of Commerce, Bureau of Standards T107; 1918. Comparative Tests of Chemical Glassware. Covers comparative tests of beakers and flasks of foreign and domestic manufacture. Methods of chemical analysis and methods of testing for coefficient of expansion, refractive index, strain, evaporation test, heat-shock test, and drop test are included.

918.1 BURETTES AND PIPETTES

American Chemical Society. Standard Sizes and Shapes of Apparatus; 1927. Includes burettes and pipettes, sizes and capacities selected as standard stock items, no detailed dimensions or specifications.

American Society for Testing Materials. Tentative Test Method. D 285–30T; 1930. Method of Test for Distillation of Crude Petroleum. Includes specifications for special 300 cc measuring pipette, dimensions and illustrated design.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus, 1922. Burettes. For 4 standard burettes, (funnel top; 3 way stopcock; bulb and 3 way stopcock with 50 ml bulb; bulb and 3 way stopcock with 75 ml bulb), requirements on general quality and annealing of glass, graduation, construction of stopcocks and burette tips, capacity and design of burette, dimensions, time of outflow, error in capacity, calibration according to Nat. Bureau of Standards methods.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Mohr Pipettes. Standard sizes, requirements on general quality and annealing of glass, design, graduation, dimensions, limits of error in graduation, calibration in accordance with methods of Nat. Bureau of Standards.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Transfer Pipettes. Standard sizes, requirements on general quality and annealing of glass, dimensions, graduation, accuracy of graduation, calibration according to Nat. Bureau of Standards methods.

References.—Analysis of glass, volume correction, ground joints. *See* 918.0.

918.2 BEAKERS, GLASSES, GRADUATES, AND FUNNELS

American Chemical Society, Standard Sizes and Shapes of Apparatus; 1927. Includes beakers, watch glasses, graduates and funnels, sizes and capacities selected as standard stock items, no detailed dimensions or specifications.

American Wood Preserver's Assn. 26a; 1923. Methods for Determination of Tar Acids in Creosote Oil. Includes specifications for graduated glass separatory funnel, dimensions and design for two types.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Graduated Cylinders. For lipped cylinders with foot and for glass stoppered cylinders with foot, standard sizes, requirements on general quality and annealing of glass, design, graduation, diameter of neck of stoppered cylinders, limits of error in graduation, calibration in accordance with methods of Nat. Bureau of Standards.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Glass Graduates. Requirements on shape and proportions, quality of glass, tipping test for stability, size, spacing, and marking of graduations, tolerances allowed on capacities for various diameters.

References.—Analysis of glass, volume corrections, ground joints, physical testing methods. *See* 918.0. Metal funnels for commercial use. *See* 612.29. Buchner porcelain funnel. *See* 532.21.

918.3 CRUCIBLES, BOTTLES, BRUSHES, AND JARS

American Chemical Society. Standard Sizes and Shapes of Apparatus; 1927. Includes crucibles and bottles, sizes and capacities selected as standard stock items, no detailed dimensions or specifications.

References.—Porcelain crucibles and other laboratory porcelain ware. *See* 532.21. Weighing bottles, tablet bottles. *See* 955.1. Laboratory and distillation flasks. *See* 918.9. Analysis of glass, volume corrections, ground joints. *See* 918.0.

918.4 BURNERS AND CLAMPS

American Chemical Society. Standard Sizes and Shapes of Apparatus; 1927. Includes burners and clamps, sizes and capacities selected as standard stock items, no detailed dimensions or specifications.

918.5 DISHES

References.—Porcelain dish. *See* 532.21.

918.6 MORTARS AND PESTLES

American Chemical Society. Standard Sizes and Shapes of Apparatus; 1927. Includes mortars, sizes selected as standard stock items, no detailed dimensions or specifications.

918.7 TUBES AND TUBING

American Chemical Society. Standard Sizes and Shapes of Apparatus; 1927. Includes tubes and tubing, sizes selected as standard stock items, no detailed specifications.

References.—Rubber tubing. *See* 204.6.

918.8 BIOLOGICAL APPARATUS AND SUPPLIES

918.81 Albuminometers

918.82 Amboceptors

918.83 Ampules

918.84 Chlorinators

918.85 Incubators, Biological

918.86 Haemacytometers

U. S. Gov., Dept. of Commerce, Bureau of Standards LC307; 1931. Haemacytometer Chambers. Requirements on general quality of glass, general design, permissible errors in depth, rulings, and graduations, required planeness of cover glasses. Requirements must be met in order to get Bureau of Standards precision seal.

Reference.—Analysis of glass. *See* 918.0.

918.87 Spatulas

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Porcelain Spatula. Requirements on general quality of porcelain for long spatula with knob at opposite end, standard sizes and dimensions, tolerance on capacity, test requirements for resistance to rapid heating and cooling, resistance to hot alkalies, freedom from porous surface, and softening at high temperatures, to be entirely glazed.

918.9 MISCELLANEOUS LABORATORY APPARATUS AND SUPPLIES

American Chemical Society. Standard Sizes and Shapes of Apparatus; 1927. Includes absorption bulbs and tubes, adapters, alkalimeters, annealing cups, ball mills, baskets, baths, calcium chloride tubes, capsules, casseroles, centrifuge tubes, color comparison tubes, combustion tubes and boats, condensers, cylinders, desiccators, distilling tubes, extraction apparatus, filter paper, flasks, funnel tubes, gas analysis apparatus, lecture apparatus, potash bulbs, rubber tubing, spatulas, stopcocks, sulphur apparatus, supports, tongs, triangles, urine analysis apparatus, weighing bottles. Sizes and capacities selected as standard stock items, no detailed dimensions or specifications.

American Society for Testing Materials C 68–30; 1930. Method of Test for Determination of Approximate Apparent Specific Gravity of Fine Aggregate. Includes special glass flask for specific gravity determinations, design, dimensions, graduation requirements, illustrated.

American Society for Testing Materials D 20–30; 1930. Method of Test for Distillation of Bituminous Materials Suitable for Road Treatment. Includes specifications for distillation flask and glass condenser tube, dimensions and design.

American Society for Testing Materials D 86–30; 1930. Method of Test for Distillation of Gasoline, Naphtha, Kerosene, and Similar Petroleum Products. Includes standard 100 cc Engler flask, dimensions and shape, tolerances, illustrated.

American Society for Testing Materials D 158–28; 1928. Methods of Testing Gas Oils. Includes Saybolt distilling flask, condenser of brass tubing, sheet metal shield, ring support and asbestos boards, dimensions and general design.

American Society for Testing Materials D 246–30; 1930. Method of Test for Distillation of Creosote Oil. Includes side neck glass distillation flask, tapered glass condenser tube, galvanized iron shield, dimensions, general design and assembly.

American Society for Testing Materials. Tentative Test Method D 285–30T; 1930. Method of Test for Distillation of Crude Petroleum. Includes specifications for Hempel distilling flask, design, dimensions and tolerances, for 300 cc capacity.

American Wood Preserver's Assn. 11c; 1929. Standard Distillation of Creosote Oil. Includes specifications for distilling flask and condenser tube. Design, dimensions and permissible variations for glass flask and tube.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Boiling Flasks. For flat bottom, ring neck; round bottom, short ring neck; and flat bottom, vial mouth flasks; list of standard sizes, requirements on general quality and annealing of glass, accuracy of capacity rating, dimensions, recommended requirements on resistance toward water, mineral acids, alkalies, heat shock, and mechanical shock, tested in accordance with Nat. Bureau of Standards paper T107.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Distilling Flasks. For flasks with tubulature, standard sizes, requirements on general quality and annealing of glass, design, dimensions, recommended requirements on resistance to water, acids, alkalies, heat shock, and mechanical shock using test methods given in Nat. Bureau of Standards paper T107.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Erlenmeyer Flasks. Standard sizes for narrow mouth flasks, requirements on general quality and annealing of glass, accuracy of rated capacity, dimensions, recommended requirements on resistance to water, acids, alkalies, heat shock, and mechanical shock using test methods given in Nat. Bureau of Standards paper T107.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Kjeldahl Flasks. Round bottom, long neck flasks, requirements on general quality and annealing of glass, accuracy of rated capacity, list of standard sizes, dimensions, recommended requirements on resistance to water, acids, alkalies, heat shock, and mechanical shock using test methods given in Nat. Bureau of Standards paper T107.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Laboratory Porcelain Ware. Standard sizes and dimensions for annealing cups, boats, casseroles, combustion capsules, high and low form crucibles and crucible covers, dishes, buchner funnels, gooch crucibles and covers, perforated plates for funnels, plates for color reactions, long spatula with knob, dupont nitrometer, requirements on surfaces to be glazed, general quality of porcelain, tolerance on capacity, tests for resistance to rapid heating and cooling, resistance to hot alkalies, freedom from porous surface, and softening at high temperatures.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Volumetric Flasks. Requirements on general quality and annealing of glass, on design, marking, dimensions, calibration according to methods of Nat. Bureau of Standards, for both stoppered and unstoppered flasks, standard sizes.

U. S. Pharmacopoeial Convention (Inc.). Pharmacopoeia of U. S. A.; 1926. Glass Wool. Physical properties, test requirements for freedom from lead. For use in chemical testing.

References.—Analysis of glass, volume corrections, ground joints, physical testing methods. *See* 918.0. Methods of sampling and testing clay and clay products. *See* 531.0.

919. MISCELLANEOUS SCIENTIFIC AND LABORATORY APPARATUS

919.1 WEIGHTS AND MEASURES

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. 1 Pint, 1 Quart, 2 Quart, and 1 Gallon Measures. Dimensions, metal gage, and design of liquid measures with handle and lip, of tin or cold rolled steel.

National Conference on Weights and Measures. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Commercial Weighing and Measuring Devices. Linear Measures. Requirements on permissible materials, protection of non-metallic measures, allowed length tolerances including tolerances for metallic tapes, width of graduations.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Dry-Capacity Measures. Includes baskets used as measures, permissible materials, permissible capacities, requirements on marking of capacity, shape, structural features, minimum diameters, allowed tolerances on correctness of capacity.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Liquid Capacity Measures. Requirements on thickness of material for steel, iron, or copper vessels, permissible capacities, structural features, marking of capacity, permissible tolerances on capacity.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Weights. Permissible materials, requirements on finish, protective coating, marking of value on weight, tolerances allowed on weights for avoirdupois system, for apothecaries' system and for metric system, for weights up to 50 pounds.

U. S. Gov., Dept. of Commerce, Bureau of Standards C3; 1918. Design and Test of Standards of Mass. For 5 classes of weights, including highest precision and also precise commercial standards, commercial test weights, high precision laboratory standards, and analytical and similar laboratory weights, requirements on allowable materials and their properties, shape and construction, plating and tests for corrosion, marking, maximum error permitted, test for constancy, regulations governing the testing and certification of weights by the Bureau of Standards.

U. S. Gov., Dept. of Commerce, Bureau of Standards C43; 1921. Jewelers and Silversmiths Weights and Measures. The international metric carat of 200 milligrams was put into commercial use in 1913 by dealers in gems, was adopted by Treasury Dept. in the customs service, and is recognized by Bureau of Standards for certification of carat weights submitted for test. Tables in C43 give relations between metric and the old carat.

U. S. Gov., Dept. of Commerce, Bureau of Standards C47 and Suppl.; 1914. Units of Weight and Measure. Definitions of units of length, area, volume, capacity, and mass, distinction between units and standards of measurement, tables of comparison of metric and customary units.

U. S. Gov., Dept. of Commerce, Bureau of Standards C55; 1915. Measurements for the Household. Gives information as to units, methods, and instruments of measurement useful in household activities, describes suitable household weights and measures test sets and method of use in checking purchases, checking of thermometers, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards H11; 1927. Weights and Measures Administration. Contains information regarding a comprehensive system of weights and measures administration, such as functions of the weights and measures official, organization of weights and measures administration in U. S., fee systems as applied to inspections, use of weights and measures standards, testing of commercial weighing and measuring devices, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards LC116; 1924. Conversion Tables. For square feet into square meters, square meters into square feet, cubic feet into cubic meters, and cubic meters into cubic feet.

U. S. Gov., Dept. of Commerce, Bureau of Standards S527; 1926. Short Tests for Sets of Laboratory Weights. Three kinds of tests outlined, a rough check for gross errors, the comparison with each other of just enough weights and combinations of weights so that the value of each weight can be computed from a standard weight, the comparison of weights so that the agreement of various results will be a check against errors in observations.

References.—Scales and balances. *See* 793.5. Liquid measuring devices. *See* 793.6. Milk bottles, lubricating oil bottles. *See* 955.1.

919.2 AERONAUTICAL INSTRUMENTS

References.—Aeronautical instruments. *See* 724.26.

919.3 COMPASSES

References.—Radiocompass. *See* 718.66.

919.4 HYDROMETERS

U. S. Gov., Dept. of Commerce, Bureau of Standards C16; 1922. The Testing of Hydrometers. Also C19; 1924. Standard Density and Volumetric Tables. For density and specific gravity hydrometers, Baumé hydrometers, hydrometers for sulphuric acid, alcoholometers, saccharometers, and thermohydrometers. Requirements to be met by instruments being submitted to bureau for test and certification, such as standard temperature of test, structural features and materials, inscription regarding use, range of graduation for various liquids, graduation according to tables in C19, permissible errors.

U. S. Gov., Dept. of Commerce, Bureau of Standards T115; 1918. New Baumé Scale for Sugar Solutions. Adopted by Manufacturing Chemists Assn. of U. S., the Bureau of Standards, and by all American manufacturers of hydrometers. Scale is based on specific gravity values of Plato, 20° C., and the modulus 145. Tables show relation between degrees Brix or per cent sucrose, specific gravity, and degrees Baumé.

919.5 MANOMETERS

919.6 NAUTICAL INSTRUMENTS

References.—Sextant for marine use. *See* 916.22. Radiocompass. *See* 718.66. Ship details and equipment. *See* 725.4.

919.7 THERMOGRAPHS AND HYDROGRAPHS

919.8 THERMOMETERS AND PYROMETERS

919.80 General Items

American Society of Mechanical Engineers. Power Test Codes. Instruments and Apparatus, Pt. 3. Temperature Measurement; 1931. Includes Bourdon Tube Thermometers. Description and classification of the various types, relative advantages in the use of the liquid-filled type, the vapor-pressure type, and the gas filled type, materials of parts, recording mechanisms, range and accuracy, installation rules, precautions, corrections, calibration.

American Society of Mechanical Engineers. Power Test Codes. Instruments and Apparatus, Pt. 3. Temperature Measurement; 1931. Includes Liquid-in-Glass Thermometers. Description and classification of thermometers, dimensions and installation of thermometer wells, precautions in use of thermometers, emergent stem corrections, calibration, checking of fixed points, determination of time lag.

International Assn. of Milk Dealers. Sketch 4667-D; 1926. Standard Sanitary Thermometer Connection for Vats. Detail dimensions and thread requirements for spud fitting.

International Assn. of Milk Dealers. Sketch 4667-E; 1926. Standard Thermometer Connection for Glass Lined Tanks. Detail dimensions and threading.

Society of Automotive Engineers 1931 Handbook. Thermometer Bulbs; 1929. Dimensions of standard threaded thermometer bulb presumably for vapor pressure type thermometers for use with aircraft engines.

U. S. Gov., Dept. of Commerce, Bureau of Standards C8; 1926. Testing of Thermometers. Regulations covering the testing and certification of thermometers by the Bureau of Standards for laboratory and working standards, clinical standards, calorimetric, Beckmann, hypsometric, hygrometric, flash point, distillation, and viscometer thermometers, and special low temperature thermometers, for household and meteorological thermometers with scales graduated on the glass stem, also platinum resistance thermometers and thermocouples within certain ranges. Standard of comparison, number and choice of test points, requirements on design, placing of reference point on scale, graduation, material, workmanship, annealing gas filling, and accuracy, to be met before certificate is given.

U. S. Gov., Dept. of Commerce, Bureau of Standards C25 and Suppl.; 1927. Standard Samples. Tin, Zinc, Aluminum, Copper, and Lead. Samples No. 42b, No. 43b, No. 44b, No. 45a, and No. 49, respectively, prepared and sold by the bureau with a certificate giving the melting point in each case, for use in industry and by others as standards for calibrating pyrometers, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards C35; 1919. Melting Points of Chemical Elements, and Other Standard Temperatures. Table of melting points of elements and boiling points of some liquids, with the values indicated which are used by the bureau as standard temperatures for calibration of thermometers and pyrometers.

U. S. Gov., Dept. of Commerce, Bureau of Standards C66; 1917. Standard Samples for Thermometric Fixed Points. Description of preparation of pure samples of tin, zinc, aluminum, and copper, their chemical analyses, freezing points, and degree of purity, their use for the standardization of thermocouples, platinum resistance thermometers, pyrometers, precautions in their use, prices.

919.81 Bath Thermometers

References.—Bath thermometers for chemical and physical testing. *See* 919.82.

919.82 Chemical Thermometers

American Society for Testing Materials D 6–30; 1930. Method of Test for Loss on Heating of Oil and Asphaltic Compounds. Includes specifications for mercury test thermometer graduated from 155° to 170° C., dimensions, design, graduation, standardization, permissible error.

American Society for Testing Materials D 20–30; 1930. Method of Test for Distillation of Bituminous Materials Suitable for Road Treatment. Includes specifications for total immersion thermometer, 0° to 400° C. or 30° to 760° F., dimensions, design, graduation, standardization, permissible scale error, test for permanency of range.

American Society for Testing Materials D 36–26; 1926. Method of Test for Softening Point of Bituminous Materials. Includes specifications for test thermometers, for ranges of 30° to 180° F. and of 85° to 320° F. or equivalent centigrade ranges, dimensions, construction, graduation, standardization, permissible error.

American Society for Testing Materials D 56–21; 1921. Approved by American Standards Assn. as K8–1923. Method of Test for Flash Point of Volatile Flammable Liquids. Includes specifications for mercury thermometers for use with Tag closed tester, dimensions, construction, special graduation for the purpose for which used, accuracy requirements, for —7° to 110° C. or corresponding Fahrenheit range.

American Society for Testing Materials D 61–24; 1924. Method of Test for Softening Point of Tar Products. Includes specifications of mercury test thermometer of 30° to 180° F. range or equivalent centigrade range, dimensions, design, graduation, standardization, and permissible error.

American Society for Testing Materials D 86–30; 1930. Method of Test for Distillation of Gasoline, Naphtha, Kerosene, and Similar Products. Includes specifications for low-distillation and for high-distillation thermometers, graduated in centigrade or Fahrenheit, dimensions, graduation, construction, standardization, accuracy, test for permanency of range, for ranges of 0° to 300° C. and of 0° to 400° C.

American Society for Testing Materials D 87–22; 1922. Approved by American Standards Assn. as Z11d–1928. Method of Test for Melting Point of Pariffin Wax. Includes thermometer for measuring melting point, range 27° to 71° C. or 80° to 160° F., dimensions, design, graduation, permissible error, and standardization requirements.

American Society for Testing Materials D 88–30; 1930. Methods of Test for Viscosity of Petroleum Products and Lubricants. Includes specifications for bath and oil tube thermometers, one set graduated in centigrade and one in Fahrenheit, dimensions, design, graduation and ranges, permissible error, standardization, for ranges of 19° to 27° C., 34° to 42° C., 49° to 57° C., and 95° to 103° C., and the corresponding Fahrenheit ranges.

American Society for Testing Materials D 92–24; 1924. Approved by American Standards Assn. as Z11f–1928. Method of Test for Flash and Fire Points by Means of Open Cup. Includes special mercury thermometer graduated in centigrade or Fahrenheit, dimensions, graduation, permissible error, standardization, test requirements for permanency of range, range —6° to 400° C.

American Society for Testing Materials D 97–30; 1930. Approved by American Standards Assn. as Z11b–1928. Cloud and Pour Points of Petroleum Products. Includes specifications for thermometers, ranges —38° to 50° C. or corresponding Fahrenheit range, and —60° to 20° C., or corresponding Fahrenheit, dimensions, design, graduation, standardization, and permissible error.

American Society for Testing Materials D 139–27; 1927. Method of Float Test for Bituminous Materials. Includes specifications for test thermometer, dimensions, construction, graduation 30° to 180° F. or equivalent centigrade range, standardization, permissible error.

American Society for Testing Materials D 182–25; D 183–25; D 184–25; 1925. A. S. T. M. Partial Immersion Thermometers for General Use. Covering respective ranges of 0° to 300° F., 20° to 580° F., 20° to 760° F. and the corresponding centigrade ranges, dimensions and design, graduation, immersion, standardization, permissible scale error, test for permanency of range.

American Society for Testing Materials D 233–26; 1926. Methods of Sampling and Testing Turpentine. Includes specifications for mercury thermometer for use in turpentine distillation apparatus, graduated from 145° to 200° C., intervals and spacing of graduations, numbering, provision of reservoir and gas above mercury, accuracy requirements.

American Society for Testing Materials D 246–30; 1930. Method of Test for Distillation of Creosote Oil. Includes specifications for total immersion thermometer, range 0° to 400° C. or 30° to 760° F., dimensions, design, graduation, standardization, permissible error, test for permanency of range.

American Society for Testing Materials Tentative Test Methods D 287–30T; 1930. Method of Test for Gravity of Petroleum and Petroleum Products by Means of the Hydrometer. Includes specifications for total immersion type mercury thermometer of range from — 20° to 102° C. or — 5° to 215° F. Dimensions, design, graduation, standardization, permissible scale error.

American Society for Testing Materials. Tentative Specifications D 300–30T; 1930. Thermometers for Engler Viscosimeters. For ranges of 18° to 28° C., 39° to 54° C., and 95° to 105° C., in 0.2° C. divisions, for mercury thermometers, requirements on length, dimensions, design, graduation, standardization, permissible scale error.

American Wood Preserver's Assn. 6b; 1926. Float Test of the Residue in Creosote Oil. Dimension, material, weight, and design of float and collar, design and graduation of thermometer, preparation of sample, test procedure, thermometer range 0° to 80° C. or 30° to 180° F.

American Wood Preserver's Assn. 11c; 1929. Standard Distillation of Creosote Oil. Includes specifications for total immersion thermometer of 0° to 400° C. or 30° to 760° F., dimensions, design, graduation, standardization, test for permanency of range, permissible scale error.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Thermometers. For seven standard thermometers of which 3 are for general laboratory work including long distillation range tests, 4 are for more accurate distillation, melting and freezing ranges, all for 76 mm immersion, requirements on range, type of glass, dimensions, graduation, accuracy, using test methods of Nat. Bureau of Standards.

National Cottonseed Products Assn. Rules; 1930. Rule 277. Standard Thermometer for determination of titer. Requirements on graduation range in degrees centigrade, location of 10° mark, annealing, type glass and thickness of bulb, dimensions of bulb and thermometer, certification by Nat. Bureau of Standards, range 10° to 65° C.

U. S. Gov., Federal Specifications Board 7b; 1926. Turpentine. Includes thermometer used for turpentine distillation, 145° to 200° C., requirements on intervals and details of graduation, length and structural features of thermometer, permissible error.

References.—Thermometer fixed points, testing and certification rules. *See also* 919.80. Analysis of glass. *See* 918.0.

919.83 Clinical Thermometers

U. S. Gov., Dept. of Commerce, Bureau of Standards US1–28; 1928. Clinical Thermometers. A commercial standard selected and accepted by industry for maximum self-registering thermometers, requirements on construction, scale range, graduation, test for retention of pigment, test for entrapped gas, hard shaker test, retreat test, test for accuracy, aging, issuance of certificate of compliance with each thermometer.

U. S. Gov., Federal Specifications Board 309; 1925. Clinical Thermometers. For Fahrenheit or centigrade scale thermometers, requirements on length, thickness of stem, shape, size of bulb, and type of glass, graduation and range of scale, accuracy, repetition of reading, tests for non-receding index, hard shakers, and time required to register.

References.—Thermometer fixed points, testing and certification rules. *See also* 919.80. Analysis of glass. *See* 918.0.

919.84 Maximum and Minimum Thermometers

919.89 Miscellaneous Thermometers

U. S. Gov., Federal Specifications Board GG–T–321; 1931. Industrial Thermometers. For 7 classes of thermometers with separable metal sockets, for refrigerating brine lines, refrigerator rooms, outboard delivery, main injection, for bearings, lubricating oil, oil-cooler oil and water, fuel oil heater, condensers, feed water, low and high pressure and superheated steam, and for flue gas, requirements on material and detail dimensions of sockets, design of case, general quality of glass tubing, structural features of thermometer, continuity of mercury colmun under shaking test, graduation, accuracy.

References.—Thermometer connections, methods of testing and certification of thermometers. *See also* 919.80. Analysis of glass. *See* 918.0.

919.9 SCIENTIFIC AND LABORATORY APPARATUS NOT ELSEWHERE CLASSIFIED

U. S. Gov., Dept. of Commerce, Bureau of Standards LC94; 1923. Calibration Boxes for Testing Machines. Information on sensibility, constancy, and accuracy of portable calibration boxes used at the bureau for calibrating compression and tension testing machines, boxes are made of metal and filled with mercury, the change of volume under load being used as measure of load.

U. S. Gov., Dept. of Commerce, Bureau of Standards LC264; 1929. Proving Rings for Calibrating Testing Machines. Requirements on graduation of scale, permissible deflection of ring when loaded to capacity, constancy of readings on repeated loadings, calibration, method of use in calibration of testing machines for compression and for tension testing.

U. S. Gov., Dept. of Commerce, Bureau of Standards T112; 1919. Standardization of the Saybolt Universal Viscosimeter. Includes Engler viscosimeter, standard dimensions and tolerances as adopted in 1907 by German testing laboratories.

U. S. Gov., Dept. of Commerce, Bureau of Standards T–112; 1919. Standardization of the Saybolt Universal Viscosimeter. Gives standard dimensions of Saybolt Universal viscosimeter as proposed by the bureau and accepted by Mr. Saybolt in 1917, tables showing kinematic viscosity for various times of discharge of the standard instrument and conversion tables between standard Saybolt and the Engler.

920–929 MUSICAL INSTRUMENTS

921. PIANOS

922. PIANO ACTIONS, PARTS, AND MUSIC ROLLS

923. ORGANS

National Board of Fire Underwriters. National Electrical Code; 1931. Approved by American Standards Assn., C1–1931. Organs. Electrical circuits and parts used in control of sounding apparatus and keyboards, voltage rating of generator or battery, grounding requirements, insulation, minimum sizes, and installation of wires, requirements for fuses.

924. PHONOGRAPHS

925. BAND INSTRUMENTS

925.1 BUGLES

925.2 FIFES

925.3 TRUMPETS

929. STRINGED MUSICAL INSTRUMENTS, EXCEPT PIANOS

National Association of Musical Merchandise Mfrs. Banjo Parts; 1925. Standard nomenclature for banjo parts, illustrated.

National Association of Musical Merchandise Mfrs. Standard Guitar; 1929. Requirements on dimensions for 3 standard sizes, thickness of veneer sounding board, and string height at twelfth fret.

National Association of Musical Merchandise Mfrs. Standard Approved Ukelele. Undated. Requirements on length for 3 sizes, number of frets, minimum depth of body, general construction, height of strings above frets.

930–939 OFFICE, PRINTING, LITHOGRAPHIC AND EDUCATIONAL SUPPLIES

931. HANDWRITING SUPPLIES

931.1 PENCILS, LEADS, AND CRAYONS

References.—Cedar lumber stock for pencils. *See* 413.9. Blackboard chalk. *See* 937.1.

931.2 PENHOLDERS, PENCIL HOLDERS, CRAYON HOLDERS

931.3 PENS

References.—Fountain pen stock, pyroxylin. *See* 846.5.

931.4 ERADICATORS AND ERASERS

U. S. Gov., Federal Specifications Board 539; 1927. Steel Erasers. For knife-blade type and arrow type, requirements on quality of steel, dimensions of handle and blade, testing keenness of cutting edge.

References.—Solvent for laundry marking inks. *See* 933.0.

931.5 DESK PADS, BLOTTER HOLDERS, AND HAND BLOTTERS

U. S. Gov., Federal Specifications Board GG–C–101; 1930. Calendar Pads and Stands. For 3 types, ordinary folding type, bound memorandum type, and large size folding executive type, requirements on substance and general quality of paper, size of sheets, punching, printed matter on sheet, dimensions and structural features of metal base, paper in accordance with specifications of U. S. Congress, Joint Committee on Printing.

References.—Blotting paper. *See* 471.1.

931.6 PAPER AND INKS

References.—Writing paper, composition books. *See* 478.1, 481. Writing inks. *See* 933.1.

932. OFFICE DEVICES AND SUPPLIES (EXCEPT HANDWRITING SUPPLIES)

932.1 OFFICE MACHINES

U. S. Gov., Federal Specifications Board GG–M–71; 1930. Lever Type Numbering Machines. Requirements on general structural features of machine and handle, finish, adjustability, endurance test.

932.2 SUPPLIES FOR OFFICE MACHINES

U. S. Gov., Dept. of Commerce, Bureau of Standards C95; 1925. Inks, Typewriter Ribbons and Carbon Paper. For typewriter and similar ribbons, discusses their manufacture and desirable properties, gives typical methods of examination and testing, including serviceability tests.

U. S. Gov., Federal Specifications Board DDD–R–271; 1930. Computing and Recording Machine Ribbons. For single color record and copying ribbons of black, blue, purple, and red, and for 2 color and 3 color ribbons, requirements on general quality of cotton cloth, thread count, thickness, tensile test, degree of uniformity of inking, permanence of black ink, writing and fading tests, fabric tests in accordance with F. S. B. Spec. No. 345.

U. S. Gov., Federal Specifications Board DDD–R–291; 1930. Hectograph Ribbons. For single color, purple, and for 2 color, purple and red, requirements on general quality of cloth, length, thread count, thickness, uniformity of writing, writing and copying tests, testing of fabric in accordance with F. S. B. Spec. No. 345.

U. S. Gov., Federal Specifications Board DDD–R–311; 1930. Typewriter Ribbons. For single color and for 2 color copying and record ribbons, and for combined record and copying ribbon, requirements on general quality of cotton cloth, length, thread count, thickness, uniformity of inking, writing test, copying test, and fading test, in conformity with F. S. B. Spec. 345 for textile materials.

References.—Methods of testing cotton fabrics. *See also* 300.4. Inks. *See* 933.

932.3 RECEPTACLES, SUPPORTS, AND HOLDERS

U. S. Gov., Federal Specifications Board DD–C–791; 1930. Pin and Sponge Cups. Requirements on dimensions and shape of 1 type of glass cup, general quality of glass, drop test requirements.

References.—Stationery holder, box type. *See* 435.5. Card filing trays. *See* 435.5, 613.7.

932.4 DESK CUTLERY

References.—Steel erasers. *See* 931.4.

932.5 ADHESIVES, CLIPS, AND FASTENERS

U. S. Gov., Federal Specifications Board 377; 1926. Brass Paper Fasteners. For round head fasteners and flat head fasteners, list of sizes of each type, minimum width and thickness of metal, chemical composition of brass, tensile strength.

U. S. Gov., Federal Specifications Board N–P–101; 1930. Library and Office Paste. For hard paste in water-well jars and for semiliquid paste in collapsible tubes, requirements on use of preservatives and permissible types, length of bristles and dimensions of brushes, mold test and adhesive test for paste, corrosion test for brushes and metal parts, methods of testing.

U. S. Gov., Federal Specifications Board JJJ–M–791; 1930. Mucilage. For mucilage made from pure gum acacia, requirements on general quality, amount of aluminum sulphate, freedom from foreign matter, required use of preservatives and permissible types, mold test, adhesive test, methods of testing.

U. S. Gov., Federal Specifications Board JJJ–W–151; 1930. Sealing Wax. For stick wax for heating over a flame, and for bulk wax for heating in a pot, covering 4 grades for adhesive use on various types and surfaces of paper and 1 grade for sealing bottles, use as insulation, etc. Requirements on general quality, adhesion to paper test, flame carrying capacity, resistance to conversion, drip test, test methods.

References.—Methods of testing and general requirements for metals. *See also* 644.11, 600.1. Rubber bands. *See* 208.2. Methods of testing glue. *See also* 093.0.

932.6 BINDERS AND STUB FILES

932.9 MISCELLANEOUS OFFICE DEVICES AND SUPPLIES

U. S. Gov., Federal Specifications Board 360; 1925. Rulers. For 4 lengths of maple wood rulers, 12 to 24 inches long, requirements on width and thickness, provision of brass edge.

References.—Fiber waste paper baskets. *See* 952.14.

933. INKS

933.0 GENERAL ITEMS

National Assn. of Dyers and Cleaners. Instructor in Garment Cleaning; 1928. Formula 2, Ink Remover. Formula 19, Marking Ink (laundry) Solvent. Requirements on kinds and amounts of constituents used in preparation of the mixtures.

U. S. Gov., Dept. of Commerce, Bureau of Standards C95; 1925. Inks, Typewriter Ribbons and Carbon Paper. For inks, discusses their composition and method of preparation, gives suggested and typical methods of analysis and test for gallotannate of iron inks, carbon inks, dyestuff inks, hectograph inks, indelible inks, recording inks, canceling inks, and stamp pad inks.

933.1 WRITING INKS

U. S. Gov., Federal Specifications Board TT–I–521; 1930. Record and Copying Ink. For blue-black iron gallotannate ink for writing permanent records, formula for preparation of a standard ink sample, test requirements for comparison of sample of purchased ink with standard sample as regards streaking of paper, fading by light and by alcohol, bleaching, molding, and corrosive action, required metallic iron content.

U. S. Gov., Federal Specifications Board TT–I–549; 1930. Red Ink. Directions and formula for preparation of a standard sample of red ink, streaking of paper and fading test requirements for comparison of samples of purchased ink with the prepared standard.

U. S. Gov., Federal Specifications Board TT–I–563; 1930. Writing Ink. For blue-black iron gallotannate ink for ordinary use and for fountain pens, in form of fluid, concentrated fluid, powder, or tablets, formula and directions for preparation of standard sample, test requirements for comparison of standard sample with purchased ink as regards streaking of paper, blackening, fading, molding, corrosive action, required metallic iron content.

References.—Methods of testing. *See also* 933.0.

933.2 PRINTING AND LITHOGRAPHIC INKS

U. S. Gov., Dept. of Commerce, Bureau of Standards C53; 1915. The Composition, Properties, and Testing of Printing Inks. Includes a brief description of the methods of test used at the bureau. A more complete description appears in Tech. Paper No. 39 on analysis of printing inks; this paper is now out of print.

933.3 DRAFTING AND DRAWING INKS

U. S. Gov., Federal Specifications Board 265a; 1927. Black Waterproof Drawing Ink. For ink made from carbon black, test requirements on settling out, consistency and flowing qualities, color and opacity, fading, drying, effect of solvents, and tendency to mold.

U. S. Gov., Federal Specifications Board 379; 1926. Colored Waterproof Drawing Ink. Covers 2 types, solution of water-soluble dye type and suspension of insoluble pigment type, 7 colors of each, formula for preparation of comparison sample for dissolved dye type, test requirements for absence of deposit, line drawing qualities, nonsmudging qualities, insolubility, streaking, fading, and molding tests.

References.—Methods of testing inks. *See also* 933.0.

933.4 INKS FOR OFFICE DEVICES

U. S. Gov., Federal Specifications Board TT–I–556; 1930. Stamp Pad Ink. For 5 colors of ink, directions and formulas for preparation of standard samples of ink, stamping test and fading test requirements for comparison of standard sample with samples of purchased inks.

References.—Methods of testing inks. *See also* 933.0.

933.9 SPECIAL AND MISCELLANEOUS INKS

U. S. Gov., Federal Specifications Board TT–I–542; 1930. Indelible Marking Ink for Fabrics. Covers one type for laundry and household use and one type for marking blankets and unsized or unstarched materials, requirements for time test for fading, for fading test in specified soap solutions, and tests to show effect of ink on breaking strength of fabric, fabric testing according to F. S. B. Spec. 345 for textile materials.

References.—Methods of testing inks, solvent for marking inks. *See also* 933.0. Methods of testing textile materials. *See* 300.4.

935. DRAFTSMEN'S AND ENGRAVERS' DEVICES AND SUPPLIES

U. S. Gov., Federal Specifications Board 593; 1928. Drawing Instruments (First Grade, In Sets). For nickel-silver instruments, requirements on chemical composition of nickel-silver, general qualities of steel, wood, and leather, material, design, and structural features of compasses, dividers, pens, etc., to be inspected for balance, ease of handling, alignment and operation of joints, character of threads, finish of joints.

U. S. Gov., Federal Specifications Board 602; 1928. T Squares. For 4 wooden types—fixed head, with celluloid or composition lined blade, with ebonized hardwood lined blade, and with plain wood blade, shifting double blade with celluloid or composition lined blade; for 2 metal types, fixed head with steel blade and shifting head with steel blade, requirements on general quality of wood, kinds and grades of metal allowed, construction, blades free from bow, wind, and twist, finish, metal trimmings of brass, attachment of linings, etc.

U. S. Gov., Federal Specifications Board 601; 1928. Triangles. Of fiberloid or equal celluloid composition, requirements on freedom from twist, warp, disintegration, and loss of transparency, finish, minimum thicknesses.

U. S. Gov., Federal Specifications Board 599; 1928. Straightedges. For hardwood straightedges lined with celluloid or composition, or wood lined and for steel straightedges with square edges or bevel edged, requirements on general quality of materials and workmanship, freedom from bow, wind, and twist, sample to be submitted with bid.

References.—Nickel-silver bars, rods, shapes. *See* 655.1. Thumb tacks, steel erasers. *See* 608.14, 931.4.

936. PRINTING AND LITHOGRAPHING DEVICES AND SUPPLIES

References.—Printing ink, electrotypes. *See* 933.2, 788. Back lining paper for case making machines, plate wiping paper, oiled manila tympan paper. *See* 479.4. Stereotype tissue and molding paper. *See* 476.25.

937. EDUCATIONAL SUPPLIES

937.1 BLACKBOARD CHALK

937.2 ERASERS

References.—Steel erasers. *See* 931.4.

937.3 KINDERGARTEN SUPPLIES

937.4 BLACKBOARDS

U. S. Gov., Dept. of Commerce, Bureau of Standards R75–29; 1929. Composition Blackboard. Simplified practice recommended and accepted by industry establishing a limited list of standard stock items covering widths and lengths of black blackboard of cement asbestos backing, of wood-pulp backing, and of gypsum core backing, and green blackboard of wood-pulp backing.

References.—Blackboard slate. *See* 511.51.

937.9 MISCELLANEOUS EDUCATIONAL SUPPLIES

References.—Handwriting supplies. *See* 931. Writing inks. *See* 933.1. Composition books. *See* 481.

940–949 TOYS, ATHLETIC AND SPORTING GOODS

941. TOYS

References.—Toy transformers. *See* 713.5.

942. INDOOR AMUSEMENTS

943. ATHLETIC AND SPORTING GOODS

943.1 BALLS

Amateur Athletic Union of the U. S. Handball Rules; 1931. (Publ. No. 117R of American

Sports Publ. Co., 45 Rose St., N. Y.) Hard Ball. For rubber and yarn ball, requirements on size and weight.

Amateur Athletic Union of the U. S. Handball Rules; 1931. (Publ. No. 117R of American Sports Publ. Co., 45 Rose St., N. Y.) Soft Ball. Requirements on color, size, weight, rebound, and compression under applied load.

Amateur Athletic Union of the U. S. Squash Handball Rules; 1931. (Publ. No. 117R of American Sports Publ. Co., 45 Rose St., N. Y.) Ball. Limiting values for circumference of ball.

American Bowling Congress. Atlantic Coast Bowling Assn. Pacific Coast Bowling Assn. Rules and Regulations; 1929. (Publ. No. 49R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Balls. Maximum permissible circumference and weight, permissible unbalanced weight.

American Physical Education Assn. National Section of Women's Athletics. Outdoor Baseball Rules for Girls and Women; 1930. (Publ. No. 121R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Ball. Playground ball is official, either of 3 standard sizes, required weight and tolerance for the 12-inch ball.

International Lawn Tennis Federation. U. S. Lawn Tennis Assn. Rules of Lawn Tennis; 1930. (Publ. No. 57X of Am. Sports Publ. Co., 45 Rose St., N. Y.) Tennis Ball. Requirements on smoothness and absence of stitches, diameter, weight, tolerances, rebound test, deformation under pressure test.

National Collegiate Athletic Assn. College Baseball Rules; 1930. (Publ. No. 130R of American Sports Publ. Co., 45 Rose St., N. Y.) Ball. Standards as given are the same as those of National League and American League of Professional Base Ball Clubs.

National Indoor Baseball Assn. of U. S. Hancock's Indoor Baseball Rules as revised and adopted by N. I. B. A. U. S.; 1930. (Publ. Group 1. No. 12R of American Sports Publ. Co., 45 Rose St., N. Y.) Ball. For ball made of yielding substance, requirements on circumference, weight, tolerances, white skin covering.

National League of Professional Base Ball Clubs. American League of Professional Base Ball Clubs. National Assn. of Professional Base Ball Leagues. Official Base Ball Rules; 1930. (Publ. No. 100X of American Sports Publ. Co., 45 Rose St., N. Y.) Ball. Standard weight and circumference with tolerances, the Spalding ball used by National League and Reach ball used by American League.

Playground and Recreation Assn. of America. Official Rules of Playground Base Ball; 1930. (Publ. Group 1. No. 12R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Ball. Requirements on circumference and weight with tolerances.

U. S. Field Hockey Assn. and American Physical Education Assn. Official Field Hockey Rules; 1931. (Publ. No. 38R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Ball. To be a leather cricket ball painted white or made of white leather.

References.—Volley ball, water polo ball, soccer ball, basket ball, foot ball. *See* 069.1. Lacrosse ball, golf ball, water polo ball, code ball. *See* 209.91.

943.2 GLOVES AND MITTS

References.—Baseball gloves. *See* 068.1.

943.3 MASKS, BASEBALL

943.4 BASES AND PLATES, BASEBALL

National Collegiate Athletic Assn. College Baseball Rules; 1930. (Publ. No. 130R of American Sports Publ. Co., 45 Rose St., N. Y.) Home Base, Pitchers Plate, and Bases. Standards as given are the same as those of National League and American League of Professional Base Ball Clubs.

National League of Professional Base Ball Clubs. American League of Professional Base Ball Clubs. National Assn. of Professional Base Ball Leagues. Official Base Ball Rules; 1930. (Publ. No. 100X of American Sports Publ. Co., 45 Rose St., N. Y.) Bases. To be white canvas bag filled with soft material, standard dimensions, method of attachment.

National League of Professional Base Ball Clubs. American League of Professional Base Ball Clubs. National Assn. of Professional Base Ball Leagues. Official Base Ball Rules; 1930. (Publ. No. 100X of American Sports Publ. Co., 45 Rose St., N. Y.) Home Base and Pitchers Plate. To be of whitened rubber, standard dimensions of pitchers plate.

943.5 QUOITS AND HORSESHOES

National Horseshoe Pitchers Assn. of Am. Official Horseshoe Pitching Rules; 1930. (Publ. No. 86R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Shoe. Permissible maximum length, width, and weight of horseshoe, maximum extension of calks, and maximum opening between heel calks.

943.6 MEGAPHONES

943.7 LEATHER ATHLETIC GOODS

References.—Baseball gloves. *See* 068.1. Water polo ball, volley ball, soccer ball, basket ball, foot ball. *See* 069.1.

943.8 FISHING LINES

943.9 MISCELLANEOUS ATHLETIC AND SPORTING GOODS

943.91 Athletic Clothing

References.—Rayon knit athletic shirts and track pants. *See* 397.12. Knit athletic shirts and polo shirts. *See* 309.4.

943.92 Athletic Outfits

943.93 Golf Goods

U. S. Golf Assn. The association rule on form and make of golf clubs states that no substantial departure from the traditional and accepted form and make of golf clubs will be accepted and that the use of mallet headed type or clubs with neck bent to produce a similar effect will be regarded as illegal; 1931.

References.—Golf ball, hickory golf shafts. *See* 209.91, 429.9.

943.94 Field and Track Goods and Apparatus

Amateur Athletic Union of the U. S. Specifications of Apparatus; 1931. (Publ. No. 117R of American Sports Publ. Co., 45 Rose St., N. Y.) Hammer Throwing Cage. Requirements on diameter and height, size of opening, size of wire and mesh, size and setting of pipe standards.

Amateur Athletic Union of the U. S. Specifications of Apparatus; 1931. (Publ. No. 117R of American Sports Publ. Co., 45 Rose St., N. Y.) Hurdles. For high and low hurdles, standard heights, width, length of base, weight, and color of top bar.

Amateur Athletic Union of the U. S. Specifications of Apparatus; 1931. (Publ. No. 117R of American Sports Publ. Co., 45 Rose St., N. Y.) Jump Standards and Pole Vault Standards. For wooden cross bars and cross bar supports, standard shape and dimensions.

Amateur Athletic Union of the U. S. Specifications of Apparatus; 1931. (Publ. No. 117R of American Sports Publishing Co., 45 Rose St., N. Y.) Sector Flags. For metal flag for marking throwing sector, requirements on dimensions and color of flag, size and length of standard.

Amateur Athletic Union of the U. S. Specifications of Apparatus; 1931. (Publ. No. 117R of American Sports Publ. Co., 45 Rose St., N. Y.) Seven-Foot Circle. For metal, wood, or rope circle for throwing events, requirements on thickness of material used, size of circle.

Amateur Athletic Union of the U. S. Specifications of Apparatus; 1931. (Publ. No. 117R of American Sports Publ. Co., 45 Rose St., N. Y.) Stop Board. For wood board, standard width, length, and height, color.

Amateur Athletic Union of the U. S. Specifications of Apparatus; 1931. (Publ. No. 117R of American Sports Publ. Co., 45 Rose St., N. Y.) Take-Off Board. For wood board, standard length, width, and height, color.

Intercollegiate Assn. of Amateur Athletes of America (Publ. No. 45R of American Sports Publ. Co., 45 Rose St., N. Y.); 1931. Discus. For disks of wood and brass, requirements on dimensions, construction, shape, dimensions of brass disks, total weight.

Intercollegiate Assn. of Amateur Athletes of America (Publ. No. 45R of American Sports Publ. Co., 45 Rose St., N. Y.); 1931. Hammer. Requirements on material and shape of head, size of wire handle, construction, length and weight of head and handle.

Intercollegiate Assn. of Amateur Athletes of America (Publ. No. 45R of American Sports Publ. Co., 45 Rose St., N. Y.); 1931. High Jump or Vaulting Standards and Supports. Standard dimensions and cross sectional shape of wooden cross bar and of cross-bar support.

Intercollegiate Assn. of Amateur Athletes of America (Publ. No. 45R of American Sports Publ. Co., 45 Rose St., N. Y.); 1931. Hurdles. For high and low hurdles, requirements on height, weight, length of base and rigidity.

Intercollegiate Assn. of Amateur Athletes of America (Publ. No. 45R of American Sports Publ. Co., 45 Rose St., N. Y.); 1931. Javelin. For wood javelin with iron or steel point, requirements on location of center of gravity, construction of grip, total length and weight.

Intercollegiate Assn. of Amateur Athletes of America (Publ. No. 45R of American Sports Publ. Co., 45 Rose St., N. Y.); 1931. Shot. Requirements on shape, weight, and permissible materials.

Intercollegiate Assn. of Amateur Athletes of America (Publ. No. 45R of American Sports Publ. Co., 45 Rose St., N. Y.) Official Handbook; 1931. 35 lb. Weight. Requirements on shape, materials, and construction of lead head and triangular iron or steel handle, dimensions of handle, length and total weight of head and handle.

National Collegiate Athletic Assn. Track and Field Rules; 1930. (Publ. No. 112R of American Sports Publ. Co., 45 Rose St., N. Y.) Broad Jump Base. Standard width and length of joist used for base.

National Collegiate Athletic Assn. Track and Field Rules; 1930. (Publ. No. 112R of American Sports Publ. Co., 45 Rose St., N. Y.) Disks. For metal rimmed wooden body disks, requirements on shape, dimensions of brass plate inserts and of discus, weight.

National Collegiate Athletic Assn. Track and Field Rules; 1930. (Publ. No. 112R of American Sports Publ. Co., 45 Rose St., N. Y.) Hammer. For metal sphere hammer head, requirements on size, and length of spring steel wire in handle, total weight.

National Collegiate Athletic Assn. Track and Field Rules; 1930. (Publ. No. 112R of American Sports Publ. Co., 45 Rose St., N. Y.) High Jump and Pole Vault Equipment. Requirements on shape and dimensions of cross bar and on shape and limiting dimensions of supporting pins for cross bar.

National Collegiate Athletic Assn. Track and Field Rules; 1930. (Publ. No. 112R of American Sports Publ. Co., 45 Rose St., N. Y.) Hurdles. For high hurdles and low hurdles, standard heights, limiting dimensions of base and of top bar, approximate weight, painting.

National Collegiate Athletic Assn. Track and Field Rules; 1930. (Publ. No. 112R of American Sports Publ. Co., 45 Rose St., N. Y.) Javelin. For wooden javelin with metal point, requirements on construction of grip, length, location of center of gravity, weight.

National Collegiate Athletic Assn. Track and Field Rules; 1930. (Publ. No. 112R of American Sports Publ. Co., 45 Rose St., N. Y.) Shot. Standard to be a 16-pound metal sphere.

References.—Relay baton. *See* 429.9.

943.95 Lacrosse Goods

U. S. Intercollegiate Lacrosse Assn. Lacrosse Rules; 1931. (Publ. No. 113R of Am. Sports Publ. Co., 45 Rose St., N. Y.) The Crosse. For any length, requirements on weaving and use of cat gut, permissible maximum width.

U. S. Intercollegiate Lacrosse Assn. Lacrosse Rules; 1931. (Publ. No. 113R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Goal. Requirements on construction, dimensions, mesh of netting, and installation.

References.—Lacrosse ball. *See* 209.91.

943.96 Hockey Goods and Apparatus

Amateur Athletic Union of the U. S. Official Athletic Rules. 1931. (Publ. No. 117R of American Sports Publishing Co., 45 Rose St., New York, N. Y.) Ice Hockey. For goalkeepers' pads, requirements on method of application and permissible total width when applied.

National Collegiate Athletic Assn. Ice Hockey Rules; 1930. (Publ. No. 92R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Goalkeepers Pads. Permissible maximum width.

National Collegiate Athletic Assn. Ice Hockey Rules; 1930. (Publ. No. 92R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Goal Cages. Requirements on height, width, and construction.

National Hockey League. Laws of Hockey; 1929. (Publ. No. 90R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Goalkeepers Pads. Permissible maximum width.

References.—Hockey ball, hockey stick, puck. *See* 943.1, 429.9, 209.92.

943.97 Basket-Ball Goods and Apparatus

American Physical Education Assn., National Section on Women's Athletics. Women's Official Basket Ball Rules; 1930. (Publ. No. 17R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Backboards and Baskets. Required dimensions of backboards of plate glass or wood, diameter of metal ring basket, provision of net, attachment of ring and location on backboard.

Joint Basketball Rules Committee representing Y. M. C. A., Amateur Athletic Union, and Nat. Collegiate Athletic Assn. Official Basketball Rules; 1931–32. (Publ. No. 700X of Am. Sports Publ. Co., 45 Rose St., N. Y.) Backboards and Baskets. For glass or wood backboards, required dimensions of board, color, diameter and color of ring, recommended size of cord in net, attachment of ring to board and distance of ring from board.

References.—Basket ball. *See* 069.1.

943.98 Bowling Goods and Apparatus

American Bowling Congress. Atlantic Coast Bowling Assn. Pacific Coast Bowling Assn. Rules and Regulations; 1929. (Publ. No. 49R of Am. Sports Publ. Co., 45 Rose St., N. Y.) Alleys. Requirements on width, length, space behind foul line, size and location of pin spots, size and construction of gutters, width and depth of pit, height of side and center partitions.

References.—Bowling ball, bowling pins. *See* 943.1, 429.9.

943.99 Athletic and Sporting Goods Not Elsewhere Classified

Amateur Athletic Union of the U. S. Official Athletic Rules. 1931. Publ. No. 117R of American Sports Publishing Co., 45 Rose St., New York, N. Y. Squash Handball. For the racquet, requirements on length, dimensions of head, to be strung with gut.

References.—Baseball bat, spring boards. *See* 429.9. Volley ball and tennis nets. *See* 317.7.

950–959

CONTAINERS

950. GENERAL ITEMS

American Railway Assn., Freight Container Bureau M–5991; 1928. Dictionary of Recommended Standard Terms to be Used in Describing Loading and Bracing Methods for Fresh Fruits and Vegetables.

American Railway Assn. Transportation Div. Dictionary of Recommended Standard Terms to be Used in Describing Loading and Bracing Methods for Fresh Fruits and Vegetables. Definitions of terms relating to car loading.

References.—Skid platforms. *See* 959.9.

951. BARRELS, DRUMS, AND TUBS

951.1 BARRELS

951.10 General Items

U. S. Gov., Congress. 38 Stat., ch. 158, p. 1186; 63d Cong.; 1915. An act to fix the standard barrel for fruits, vegetables, and other dry commodities. Requires sale and shipment in interstate commerce of fruits, vegetables, etc., in barrels of 7,056 cubic inch capacity or fraction thereof and of cranberries in barrels of dimensions stated in act, places enforcement with Bureau of Standards.

U. S. Gov., Congress. Public No. 228, 64th Congress (S5425). 1916. An act to standardize lime barrels. Requires shipment and sale of lime in interstate commerce and foreign commerce in barrel of 280 pounds net or in barrel of 180 pounds net or in containers of fractional part of the standard small barrel, requires marking of weight on container, places enforcement with Bureau of Standards.

U. S. Gov., Dept. of Commerce, Bureau of Standards. C64; 1917. Rules and Regulations for Enforcement of the Lime Barrel Act. Mandatory requirements on shipment of lime in interstate or foreign commerce, net weight requirements for 2 standard barrel sizes and of other containers of less capacity than small barrel, marking and tagging requirements, copy of act included.

U. S. Gov., Dept. of Commerce, Bureau of Standards C71; 1917. Rules and Regulations Promulgated under Authority of the Federal Standard-Barrel Law. Gives the capacity of the standard barrel as fixed by law for fruits, vegetables, and other dry commodities (not including lime barrels) and of the standard barrel for cranberries, establishes dimensions of standard barrels and fractional barrel, length of stave, etc., tolerances. Copy of standard barrel act included.

951.11 Fiber Barrels

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 41, section 12. Fiber Barrels. For single or multiple ply construction, requirements on weight of barrel and contents, dimensions, Mullen test, thickness and securing of metal, wood or fiber tops or bottoms, general construction, for shipment of dry and of semiliquid articles.

References.—Standard barrel sizes and dimensions. *See* 951.10. Container fiberboard. *See also* 472.93. Standard thicknesses, methods of testing fiberboard. *See also* 472.0, 470.3.

951.12 Metal Barrels

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 5. Barrels. For iron, steel, or aluminum barrels for other than explosives and dangerous articles, requirements on thickness of metal for barrels for shipping dry articles and for barrels for liquids for capacities from 5 to 165 gallons, aluminum barrels with metal hoops or jackets up to 110 gallons capacity, capacities of single trip containers, fastening of tops, plugs, etc.

Steel Barrel Mfrs. Institute. Steel Barrels and Drums; 1931. Standard sizes, standard dimensions, and threading of countersunk plugs and of raised head plugs, standard sizes and threading of flanges, standard spacing of rolling hoops.

U. S. Gov., Dept. of Commerce, Bureau of Standards R20–28; 1928. Steel Barrels and Drums. Simplified practice recommended and accepted by industry establishing a limited list of standard stock types and capacities of bilge barrels and drums.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 5, 5A, 5B, 5C, 5D, 5E, and 5F. Steel Barrels or Drums. For bilge types and straight-sided types, mandatory requirements on gage and weight of metal, outage provision, construction, coating or lining, types and sizes of rolling hoops, types of closures, drop test, hydrostatic test, and leakage tests for various sizes and strength grades, acid-resisting qualities and tests for 5C barrel or drum, rubber lining and test of lining for 5D barrel or drum, tests of 5E single trip container, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 6A, 6B, and 6C. Steel Barrels or Drums. For bilge types and for straight-sided types, mandatory requirements on gage and weight of metal, outage provisions, construction, coating or lining, type and sizes of rolling hoops, types of closures, drop test, hydrostatic test, and leakage tests for various sizes and strength grades of barrels or drums, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 6D, 6E, 6F, 6G, and 6H. Steel Barrels or Drums (Single Trip Containers). Mandatory requirements on construction of straight-sided types, thickness of metal, permitted gross weight, coating, drop test, dangerous materials for which authorized.

References.—Standard barrel sizes and dimensions. *See also* 951.10. Iron and steel sheets. *See* 604.2. Aluminum sheets. *See* 631.23. Zinc coatings. *See also* 600.3.

951.13 Wooden Barrels

American Railway Assn. Freight Container Bureau. Tentative Specification. Circular No. 14; 1924. Slack Barrels and Slack Casks and Inside Packing of Pottery. Classification as to size and weight, permissible moisture content and defects in lumber for staves, heads and wooden hoops, dimensions and construction of staves and heads, of wooden, wire, and steel hoops, method of packing pottery.

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circular No. 21; 1927. Slack Barrels and Inside Packing for Glass Tableware. Permissible defects and moisture in lumber, dimensions and construction of staves, heading, elm and steel wire hoops, construction of barrel, packing of glassware requirements.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 5, section 6. Wooden Barrels. For transportation of oils, requirements on materials of fir, oak, etc., maximum capacity, number and weight of hoops, lining materials, painting, fastening hoops.

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Woodenware and Cooperage. For pork barrels, requirements on kinds of wood, inside coating of paraffin, dimensions of staves and heads, number and dimensions of galvanized iron hoops.

National Pickle Packers Assn. Standard Fir Cooperage Specifications; 1924. For 8 sizes of kegs and barrels from 5 to 48 gallons, requirements on dimensions of staves and headings, circumference of bilge, thickness of timber, number and gage of metal hoops.

New York Produce Exchange. Rules Regulating the Naval Store Trade; 1921. Rule 6. Turpentine barrels, requirements on number of hoops and their location, number of coats of glue, for oak barrels of 48 to 55 gallons capacity.

New York Produce Exchange. Rules Regulating the Petroleum Trade; 1920. Rule 15. Barrels for refined petroleum, requirements on number and size of hoops.

Standard Container Mfrs., E. H. Dulaney, Agent for Southeastern Railroads. Standard Containers for Fresh Fruits and Vegetables and Loading Rules No. 5; 1928. Basket Barrel. Requirements on capacity (U. S. Gov. Stand.), dimensions of barrel, staves, head, etc., number and sizes of hoops, details of construction, kinds and quality of wood. For shipment of kale and spinach.

Standard Container Mfrs., E. H. Dulaney, Agent for Southeastern Railroads. Standard Containers for Fresh Fruits and Vegetables and Loading Rules No. 5; 1928. Open Stave Barrel. Requirements on capacity (U. S. Gov. Stand.), dimensions of staves, barrel, head, etc., number and sizes of hoops, details of construction, kinds and quality of wood. For potatoes, pears, cabbage, apples, cucumbers.

Standard Container Mfrs., E. H. Dulaney, Agent for Southeastern Railroads. Standard Containers for Fresh Fruits and Vegetables and Loading Rules No. 5; 1928. Stave Barrel. Requirements on capacity (U. S. Gov. Stand.), dimensions of barrel, staves, head, etc.; number and size of hoops, details of construction, method of securing burlap top where used, kinds and quality of wood. For potatoes, pears, cabbage, cucumbers, apples.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 10A, 10B, and 10C. Wooden Barrels and Kegs (Tight). Mandatory requirements on permissible woods and defects in wood, on moisture content at time of jointing, number and dimensions of staves and heading pieces, number, dimensions, and strength of steel hoops, quality of glue, asphaltum, paraffin, or other lining materials, etc., thickness of rubber in rubber lining, internal pressure and leakage tests, stave spring tests, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 11A and 11B. Wooden Barrels (Slack). Mandatory requirements on permissible woods, number, quality, and dimensions of staves and heading pieces, size and number of steel or wooden hoops, construction, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 35. Wooden Barrels with Removable Heads. For oak barrels, mandatory requirements on size and number of hoops, thickness of staves, construction and dimensions of removable head and method of fastening, dangerous materials for which authorized.

References.—Standard barrel sizes and dimensions. *See also* 951.10. Staves, headings and hoops. *See also* 421.0–421.3. Iron and steel hoops. *See also* 604.22.

951.2 CASKS AND TIERCES

951.21 Metal Casks

951.22 Wooden Casks

American Railway Assn. Freight Container Bureau, Tentative Specification. Circular No. 14; 1924. Slack Barrels and Slack Casks and Inside Packing of Pottery. Classed as to size and weight, permissible moisture content and defects in lumber used, dimensions and construction of staves, heads, and of wooden, wire, and steel hoops, method of packing pottery.

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Woodenware and Cooperage. For 1,450-pound curing casks, requirements on dimensions of oak staves and pine bottoms, with an alternate standard of dimensions, bilge diameter, number and dimensions of hoops.

References.—Staves, headings and hoops. *See also* 421.0–421.3. Iron and steel hoops. *See also* 604.22.

951.23 Metal Tierces

951.24 Wooden Tierces

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Woodenware and Cooperage. For lard and pickled meat tierces, requirements on kinds of oak suitable, coating, dimensions of staves and head, dimensions and number of iron hoops, capacity, for pickled meat tierces, white ash or birch may also be used.

New York Produce Exchange. Rules Regulating Transactions in Lard; 1911. Packing and Cooperage. Tierces of white or burr oak, requirements on dimensions of tierce, thickness of staves and head, hooping, for lard tierces.

References.—Staves, headings and hoops. *See also* 421.0–421.3. Iron and steel hoops. *See also* 604.22.

951.3 DRUMS

951.31 Fiber Drums

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 149; 1930. Cheese, Rating. For Cylindrical Cheese Boxes or Drums. As outside containers of fiberboard or pulpboard or a combination of fiberboard, wood and metal, requirements on thickness and strength of parts, dimensions of rims, attachment of top, construction.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 41, section 12. Fiber Drums. For single or multiple ply construction, for various weights of drum and content, requirements on dimensions, strength test and thickness of board, thickness and securing of metal, wood, or fiber tops and bottoms, general construction, for shipment of dry and semiliquid articles.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 21A. Fiber Drums. Mandatory requirements on capacity limits, thickness and construction of shell, paper seals, wooden heads, and steel rim hoops, method of closure, drop test, dangerous materials for which authorized.

References.—Container fiberboard. *See also* 472.93. Standard thicknesses, methods of testing fiberboard. *See also* 472.0, 470.3.

951.32 Metal Drums

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 5. Drums. For iron, steel, or aluminum drums for shipment of other than explosives or dangerous articles, requirements on thickness of metal for dry material drums and for liquid shipment drums, up to 165 gallons for iron or steel drums and 110 gallons for aluminum, securing of caps, plugs, etc., capacities, but no thickness requirements for single trip containers.

Institute of American Meat Packers. Packinghouse Supplies, Packs and Equipment; 1928. Lard Cans. Includes straight side metal lard drums, dimensions, design, weight of plate metal, details of seam and beading.

Steel Barrel Mfrs. Institute. Steel Barrels and Drums; 1931. Standard sizes, standard dimensions, and threading of countersunk plugs and of raised head plugs, standard sizes and threading of flanges, standard spacing of rolling hoops.

U. S. Gov., Dept. of Commerce, Bureau of Standards R20–28; 1928. Steel Barrels and Drums. Simplified practice recommended and accepted by industry establishing a limited list of standard stock types and capacities of standard light shipping drums, standard I. C. C. drums, bolted cover and friction cover light drums, grease drums, and bilge barrels, for minimum capacities of 10 gallons.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 5, 5A, 5B, 5C, 5D, 5E, and 5F. Steel Barrels or Drums. For bilge types and straight-sided types, mandatory requirements on gage and weight of metal, outage provision, construction, coating or lining, types and sizes of rolling hoops, types of closures, drop test, hydrostatic test, and leakage test for various sizes and strength grades, acid resisting qualities and tests for 5C barrel or drum, rubber lining and test of lining for 5D barrel or drum, tests of 5E single trip container.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 6A, 6B, and 6C. Steel Barrels or Drums. For bilge types and for straight-sided types, mandatory requirements on gage and weight of metal, outage provisions, construction, coating or lining, type and sizes of rolling hoops, types of closures, drop test, hydrostatic test and leakage tests for various sizes and strength grades of barrels or drums, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 6D, 6E, 6F, 6G, 6H. Steel Barrels or Drums (Single Trip Containers). Mandatory requirements on construction of straight-sided types, thickness of metal, permitted gross weight, coating, drop test, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 42B. Aluminum Drums. For shipment of inflammable liquids, mandatory requirements on construction, thickness of material, size of hoops, welding of seams, leakage test, hydrostatic test, and drop test.

References.—Iron and steel sheets. *See* 604.2. Aluminum sheets. *See* 631.23. Zinc coatings. *See also* 600.3. Sizes and threading of flanges and plugs. *See* 951.12.

951.33 Wooden Drums

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 7. Drums. Wooden drums, requirements on use, plywood construction, thickness of shell, thickness and fastening of wooden ends, construction of drums with hoops and of drums without hoops.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; p. 149; 1930, Cheese, Rating. For Cylindrical Cheese Boxes or Drums. As wooden outside containers, requirements on thickness of material, dimensions of hoops, rims, reinforcements, construction of box, fastening of top.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 22A and 22B. Wooden Drums, Glued Plywood. Mandatory requirements on general quality of lumber, number of plies and construction of shell and heads, hooping, thickness and material of head and body linings, dimensions of parts, drop test, dangerous materials for which authorized.

951.4 FIRKINS AND KEGS

951.41 Metal Firkins

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 3. Firkins. For iron or steel firkins, general requirements on fit and attachment of tops.

951.42 Wooden Firkins

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 3. Firkins. For wooden firkins, requirements on general construction of top, several alternate methods of securing top by nailing, strapping, etc.

951.43 Metal Kegs

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 13. Metal Kegs. Mandatory requirements on chemical composition of steel, annealing, crimp test, thickness of metal, dimensions and construction of keg, types and construction of closure, capacities, proportions for stove pipe kegs, drop test, dangerous materials for which authorized.

References.—Iron and steel sheets. *See also* 604.2. Methods of testing, general requirements for metals. *See also* 600.1.

951.44 Wooden Kegs

National Pickle Packers Assn. Standard Fir Cooperage Specifications; 1924. For 8 sizes of kegs and barrels from 5 to 48 gallons, requirements on dimensions of staves and headings, circumference of bilge, thickness of timber, number and gage of metal hoops.

U. S. Gov., Federal Specifications Board EE–S–71; 1930. Chili and Worcestershire Sauces. Keg for shipment of Worcestershire sauce, requirements on newness, inside coating, thickness of staves and heads, size and number of iron hoops, location and securing of bung, finish, for 5-gallon size.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 10A, 10B, and 10C. Wooden Barrels and Kegs (Tight). Mandatory requirements on permissible woods and defects in wood, on moisture content at time of jointing, number and dimensions of staves and heading pieces, number, dimensions, and strength of steel hoops, quality of glue, asphaltum, paraffin, or other lining materials, etc., thickness of rubber in rubber lining, internal pressure and leakage tests, stave spring tests, dangerous materials for which authorized.

References.—Staves, headings and hoops. *See also* 421.0–421.3. Iron and steel hoops. *See also* 604.22.

951.45 Fiber Firkins

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 3. Firkins. For firkins of indurated fiber, general requirements on construction and fit of wooden tops or headings, securing of heading to body of firkin.

References.—Container fiberboard. *See also* 472.93. Standard thicknesses, methods of testing fiberboard *See also* 472.0, 470.3.

951.5 HOGSHEADS

References.—Staves, headings and hoops. *See also* 421.0–421.3. Iron and steel hoops. *See also* 604.22.

951.6 KITS AND PAILS

951.61 Metal Kits

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 3. Kits. For iron or steel kits, general requirements on fit and attachment of tops.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 5. Kits. For iron or steel kits up to 5-gallon capacity, for shipment of other than dangerous articles, permissible minimum thickness of metal for dry material containers and for liquid containers for other than single trip containers, securing of covers.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2E. Kits and Pails. For metal kits as inside containers for shipment of dangerous materials, mandatory requirements on maximum capacity and thickness of metal, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 6D. Steel Barrels or Drums and Kits or Pails. (Single Trip Containers.) Mandatory requirements on gage thickness of metal, permitted gross weight of container, construction, drop test, dangerous materials for which authorized.

References.—Iron and steel sheets. *See also* 604.2.

951.62 Wooden Kits

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 3. Kits. For wooden kits, requirements on general construction of top, several alternate methods of securing top by nailing, straps, etc.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2E. Kits and Pails. For wooden kits as inside containers for shipment of dangerous materials, mandatory requirements on maximum capacity, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 18B. Wooden Kits. Mandatory requirements on construction, thickness of top, bottom, and staves, sizes of hoops, drop test, dangerous materials for which authorized.

951.63 Fiber Pails

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Fiber Bucket. For fire bucket, dimensions and design of recommended standard 3½-gallon bucket.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 3. Pails. For pails of indurated fiber, general requirements on construction and fit of wooden tops or headings, securing of heading to pail.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 11. Compressed Felted Pulp Pails. Requirements on one piece construction of parts, thickness and Mullen test resistance of parts, reinforcement of bottom, construction and attachment of top.

Consolidated Classification Committee. Consolidated Freight Classification, No. 6; 1930. Rule 41, section 12. Fiber Pails. For single or multiple ply construction, requirements on weight of barrel and contents, dimensions, Mullen test, thickness and securing of tops and bottoms of metal, wood or fiber, general construction, for stave and other type pails for shipment of dry articles and semiliquids.

References.—Container fiberboard. *See also* 472.93. Standard thicknesses, methods of testing fiberboard. *See also* 472.0, 470.3.

951.64 Metal Pails

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Coal Hod. Dimensions, metal gage, and design of recommended standard hod of galvanized iron.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Two-Gallon and Four-Gallon Pails. Dimensions, metal gage, and design of straight sided pails of recommended standard, made of galvanized iron.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Two-Gallon Tank Bucket. Sand Bucket. Sponging Bucket for Engine House Only. Dimensions, metal gage, and design of recommended standard bucket of each type made of galvanized iron.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 3. Pails. For iron or steel pails, general requirements on fit and attachment of tops.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 5. Pails. For iron or steel pails up to 5-gallon capacity for shipment of other than dangerous articles, permissible minimum thickness of metal for dry material containers and for liquid containers for other than single trip containers, securing of covers.

Institute of American Meat Packers. Packinghouse Supplies, Packs and Equipment; 1928. Lard Cans. Includes flaring side pails with covers up to 8-pound capacity, dimensions, design, weight of tin plate, size of wire handles, requirements.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2E. Kits and Pails. For metal pail as inside container for shipment of dangerous materials, mandatory requirements on maximum allowable capacity, thickness of metal, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 6D. Steel Barrels or Drums and Kits or Pails. (Single Trip Containers.) For pails, mandatory requirements on gage thickness of metal, permitted gross weight of container, construction, drop test, dangerous materials for which authorized.

References.—Iron and steel sheets. *See* 604.2. Zinc coatings, tin coatings. *See also* 600.3.

951.65 Wooden Pails

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 3. Pails. For wooden pails, requirements on general construction of top, several alternate methods of securing top on to pail by nailing, strapping, etc.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2E. Kits and Pails. For wooden pails as inside containers for shipment of dangerous materials, mandatory requirements on maximum allowed capacity, dangerous materials for which authorized.

951.66 Fibre Kits

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 3. Kits. For kits of indurated fiber, general requirements on construction and fit of wooden tops or headings, securing of heading.

References.—Container fibre board. *See also* 472.93.

951.7 TUBS

951.71 Metal Tubs

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 3. Tubs. For iron or steel tubs, general requirements on fit and attachment of tops.

References.—Tubs special to laundries. *See* 787.

951.72 Wooden Tubs

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 3. Tubs. For wooden tubs, requirements on general construction of top, alternate methods of securing top to tub by nailing, straps, etc., thickness of head where used and method of attachment.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 31. Jugs in Tubs. For the tub, mandatory requirements on dimensions of hoops and hardwood staves, spacing between jug and tub, dangerous materials for which the jugs packed in tubs are authorized.

References.—Tubs special to laundries. *See* 787.

951.73 Fibre Tubs

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 3. Tubs. For tubs of indurated fiber, general requirements on construction and fit of wooden tops or headings, securing of heading to tub.

952. BASKETS AND HAMPERS

952.1 BASKETS

952.10 General Items

American Railway Assn. Freight Container Bureau M–5502; 1927. Recommended Procedure for Loading Baskets by the End-to-End Offset Method. Detailed instructions and illustrated methods of loading from end to end of car, for baskets of all sizes.

U. S. Gov., Congress, Public, No. 462, 70th Congress; 1928. Standard Container Act of 1928. An act to fix standards for hampers, round stave baskets, and splint baskets for fruits and vegetables, and for other purposes. Fixes the standard capacities and defines each standard in terms of cubic inches capacity, for 9 sizes from ⅛ to 2 bushels, authorizes Sec. of Agriculture to prescribe tolerences, makes it unlawful to manufacture, sell, or ship in containers of above type that do not comply with above requirements.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. S. R. A., B. A. E. 116; 1928. Rules and Regulations of the Sec. of Agriculture under the U. S. Standard Container Act of 1928. Defines container, hamper, round stave basket, and splint basket, regulations for submission of dimension specifications by manufacturers for approval of their containers, permissible variations from standard cubical capacities fixed by law. Includes text of standard container act of 1928.

References.—Baskets used as standard capacity measures. *See* 919.1.

952.11 Fruit, Vegetable, and Berry Baskets

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circular No. 18; 1925. Four-Basket Crates with Tapered Ends for Fresh Fruits and Vegetables. Includes baskets, 3-quart capacity, construction and stapling requirements, thickness of blanks and hoops.

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circular No. 19; 1925. Six-Basket Crates for Fresh Fruits and Vegetables. Includes 4-quart baskets, thickness of blanks and hoops, construction and stapling of baskets.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Berry Baskets or Boxes. Requirements on permissible standard sizes, allowed tolerances on correctness of capacities.

Standard Container Mfrs. Six-Basket Crate. Undated. Includes requirements for baskets that fit into crate for shipment of fruits and vegetables, for 4-quart size, requirements on thickness of wood veneer, general construction, dimensions governed by standard dimensions of crate.

U. S. Gov., Congress. 39 U. S. Statutes at Large, p. 673. U. S. Standard Container Act of 1916. An act to fix standards for Climax baskets for grapes and other fruits and vegetables, and to fix standards for baskets and other containers for small fruits, berries, and vegetables and for other purposes. Fixes dimensions of standard 2-quart, 4-quart, and 12-quart Climax baskets, fixes standard capacities for baskets and containers for small fruits, berries, and vegetables, defines these capacities in cubic inches for the standard dry one-half pint, dry pint, and dry quart, makes it unlawful to manufacture for shipment, sell for shipment, or ship in interstate commerce in containers not conforming to above standards.

U. S. Gov., Dept. of Agriculture. Bureau of Agricultural Economics. Service and Regulatory Announcements No. 104; 1927. Rules and Regulations of the Sec. of Agriculture under the U. S. Standard Container Act of 1916. Regulations on method of measuring capacity, permissible tolerances on dimensions of standard Climax baskets, permissible tolerances in cubical capacity of baskets and containers for small fruits, berries, and vegetables from standards required by law. Includes text of standard container act of 1916.

References.—Round stave baskets. *See also* 958.12. Standard basket sizes. *See also* 952.10. Fiberboard baskets for fruits and vegetables. *See* 952.14.

952.12 Round-Stave Baskets

Consolidated Classification Committee. Consolidated Freight Classification No. 6; p. 418; 1930. Earthenware, Ratings. Stave Baskets for shipment of earthenware and stoneware, requirements on close weaving, number, thickness, and attachment of hoops and of metal reinforcement strips, thickness of solid wood cover and dimensions of cross batten.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 216; 1930. Fruit, Fresh, Rating. Standard Round Stave Bushel Basket for fresh fruit. Requirements on dimensions of basket, staves, hoops, and cover slats, kind of wood in staves, construction of basket and cover, provision of handles.

Consolidated Classification Committee. Consolidated Freight Classification No. 6 p. 506; 1930. Vegetables, Ratings. Round Stave Bushel Baskets for shipment of green vegetables, requirements on dimensions, capacity, thickness and wood materials for staves, dimensions of parts and construction of hoops and cover, attachment of cover.

Standard Container Mfrs. E. H. Dulaney, Agent for Southeastern Railroads. Standard Containers for Fresh Fruits and Vegetables and Loading Rules No. 5; 1928. Round Stave Bushel Basket. Requirements on diameter, depth, and capacity, on number and dimensions of staves and hoops, on details of construction of basket and cover.

References.—Standard basket sizes. *See* 952.10.

952.13 Coal Baskets

952.14 Fiber-Board Baskets

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 41, section 13. Fiberboard Baskets. For Climax type for fruits and vegetables, general construction of box, cover, wire handles, for 2 to 40 quart capacity, thicknesses of parts, Mullen test for strength, and gross weight, fastening of covers. Includes one-piece type of construction of double jute lined board.

Standard Container Mfrs. E. H. Dulaney, Agent for Southeastern Railroads. Standard Containers for Fresh Fruits and Vegetables and Loading Rules No. 5; 1928. Fiberboard Baskets. For standard lettuce basket and standard bushel basket, requirements on dimensions, on construction of basket and cover, thickness and strength of material, waterproofing, and method of sealing, for citrus fruits and vegetables of 65 pounds gross weight.

U. S. Gov., Federal Specifications Board LLL-R-191; 1930. Fiber Waste Paper Receptacles, Office and Lobby. For round type, requirements on dimensions and construction of office type and lobby type, thickness and general quality of fiber, load bearing test, colors according to standards of General Supply Committee.

References.—Standard basket sizes. *See* 952.10. Container fiberboard. *See also* 472.93. Standard thicknesses, methods of testing fiberboard. *See also* 472.0, 470.3.

952.19 Miscellaneous Baskets

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 499; 1930. Traps, Ratings. Bushel Baskets for shipment of animal traps, requirements on number and thickness of hoops, construction, reinforcement and attachment of cover.

952.2 HAMPERS

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 158; 1930. Clothing, Ratings. Canvas Hampers for shipment of clothing, requirements on weight of canvas, lining with wire netting, mesh of netting, method of fastening top.

Standard Container Mfrs. Bushel Hampers; 1924. Requirements on standard inside dimensions, capacity, dimensions, design, and construction of staves, bottom, hoops, and cover, kinds and general quality of wood. For shipment of beans, beets, onions, radishes, okra, peas, peppers, romaine, lettuce, kale, spinach, cucumbers, and sweet potatoes.

Standard Container Mfrs. Standard 1½ Bushel Hamper. Undated. Requirements on standard inside dimensions, capacity, number, dimensions, and assembly of staves, bottom, hoops, and cover, kinds and general quality of wood. For shipment of lettuce, romaine, kale, spinach, chicory, cauliflower, and cabbage.

References.—Canvas and duck. Standard sizes of vegetable and fruit hampers. *See* 952.10.

953. BOXES

953.1 METAL BOXES

References.—Metal cases. *See* 954.21.

953.2 PAPER AND FIBRE BOARD BOXES

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circular No. 6; 1923. Solid Fibre and Plyboard Boxes for Boots and Shoes. Requirements for stitching or gluing closing flaps, quality and type of materials and weight in liners and fillers, compositions, specific gravity and amount of silicate of soda, dimensions of wire staples or stitches, weight and Mullen test or sealing paper tape, dimensions, thickness and Mullen test requirements for boxboards and boxes.

American Railway Assn. Freight Container Bureau. Tentative Specification. Circular No. 11; 1923. Corrugated Strawboard Boxes for Boots and Shoes. Applies to boxboard with 1 or 2 corrugated strawboards between facings, requirements for stitching or gluing of closures, weight and waterproofing test requirements for materials, composition of strawboard and of silicate of soda used, dimensions of wire staples or stitches, weight, and Mullen test of kraft paper for sealing seams, grade of glue, minimum thicknesses, and Mullen test requirements for boxboard for various size boxes, construction of corrugated boxboard and boxes.

Associated Knit Underwear Mfrs. of America. Box sizes for underwear, same as given in commercial standard CS33–32, published by Bureau of Standards of U. S. Gov.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 1b. Boxes. For solid cane fiberboard boxes and for pressed wood fiberboard boxes, requirements on reinforcement with wooden strips, attachment of strips, fit of parts, permissible minimum thickness.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 1c. Boxes of hardened fiberboard. For boxes made in halves of equal dimensions for telescoping over ends of 5-gallon cans, requirements on construction, strength of steel binding wire or strap, minimum thickness of sides, strength, test for waterproofness and oilproofness, diagonal load test.

Consolidated Classification Committee. Consolidated Freight Classification No. 6 and Supplement No. 6; 1930. Rule 41, sections 2 and 4. Fiber Boxes without frames. For 3-ply fiberboard or double-strength or double-faced corrugated fiberboard boxes, requirements on construction, thickness of boards and of plies, weight of box and of contents, waterproofing, maximum dimension, strength, for 16 construction types, strength and application of sealing paper.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 41, section 2a. Kraft Board Boxes Without Wooden Frames. For telescope boxes, requirements on number of plies in board, number of layers of board in sides and ends, construction, waterproofing, maximum weights of box and contents, maximum dimensions, minimum thickness and strength of board.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 41, sections 3 and 4. Boxes. For fiberboard or pulpboard boxes with wooden frames, requirements on construction, weight of box and contents, thickness of board, Mullen test, dimensions and spacing of wooden strips, for single and 3 ply boxes, strength and application of paper sealing strips.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 41, section 5. Wire Bound Fibre Boxes. Fiberboard to be double fiber lined, requirements on number and size of wooden cleats, construction of box, size and spacing of binding wires, fastening of binding wires.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; p. 149; 1930. Cheese, Rating. For Cylindrical Cheese Boxes or Drums. As outside containers of fiberboard or pulpboard or a combination of fiberboard, wood and metal, requirements on thickness and strength of parts, dimensions of rims, attachment of top, construction.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; p. 153; 1930. Cigarettes, Rating. Fiberboard, pulpboard, or corrugated strawboard boxes for cigarettes, requirements on cording, strapping and reinforcing in addition to requirements of rule 41 which also apply.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; p. 155; 1930. Cigars, Rating. Fibreboard, pulpboard, or corrugated strawboard boxes for cigars, requirements on use of sealing strips, cording, strapping and reinforcing in addition to requirements of rule 41 for various types of boxes.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; p. 273; 1930. Hats or Caps, Ratings. Fibreboard or Corrugated Strawboard Boxes for packing hats or caps, requirements on Mullen test resistance, to meet requirements of rule 41, section 2, except that dimensions of boxes are between 70 and 90 united inches.

National Assn. of Hosiery and Underwear Manufacturers. U. S. Dept. of Commerce. Bureau of Standards paper T253; 1924. Standardization of Hosiery Box Dimensions. Dimensions of selected standard packing boxes for ladies', men's, and children's hose with methods of folding and packing, for different weights and for various materials.

National Canners Assn. Canned Food Boxes; 1928. For solid fiber containers, wire-bound fiber-board boxes, and corrugated strawboard boxes, standard sizes as measured by capacity for standard cans, requirements on number of plies, thickness of ply, Mullen test strength, waterproofing, fastening of joints and seams, dimensions of cleats and binding wires, etc.

National Paper Box Manufacturers Assn. Terminology for the Set-up Paper Box Industry. Undated. Definitions of standard terms describing box construction, materials, machines, processes of manufacture, order of giving measurements, standard types illustrated and named.

Paperboard Industries Assn. Handbook of Corrugated and Solid Fiber Containers; 1928. Standard names for the various kinds of fiber boxes, includes illustrations and descriptive matter for the various types and method of sealing.

Standard Container Mfrs., E. H. Dulaney, Agent for Southeastern Railroads. Standard Containers for Fresh Fruits and Vegetables and Loading Rules No. 5; 1928. Fiberboard Boxes. For citrus fruits moving under refrigeration, for ¼, ½, and 1 bushel sizes, requirements on dimensions, construction of box bodies and covers, thickness and strength of material, waterproofing and sealing, gross weight limits.

U. S. Gov., Dept. of Commerce, Bureau of Standards CS33–32; 1931. Knit Underwear (Exclusive of Rayon.) A commercial standard selected and accepted by industry. Includes standard box sizes for men's and boys' union suits, shirts and drawers, widths and lengths of 5 standard sizes, included as recommended practice.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R64–30; 1930. One Pound Folding Boxes for Coffee. Simplified practice recommended and accepted by industry establishing standard dimensions for 2 standard sizes of paper board or fiberboard folding boxes for shipment of coffee.

U. S. Gov., Dept. of Commerce, Bureau of Standards R128–31; 1931. Corrugated Boxes. Used by department and specialty stores. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes of corrugated boxes used for packing merchandise in stores, number assigned to each box, inside dimensions given for each box.

U. S. Gov., Dept. of Commerce, Bureau of Standards R127–31; 1931. Folding Boxes. Used by department and specialty stores. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes of folding boxes used for packing merchandise in stores, number assigned to each box, dimensions given for width, length, and depth.

U. S. Gov., Dept. of Commerce, Bureau of Standards R126–31; 1931. Set-Up Boxes. Used by department and specialty stores. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes of set-up boxes used for packing merchandise in stores, number assigned to each box, dimensions given in length, width, and depth.

U. S. Gov., Dept. of Commerce, Bureau of Standards T253; 1924. Standardization of Hosiery Box Dimensions. Gives dimensions of proposed standard boxes, the number of sizes being dependent on number of pairs per box, number of folds, and the material of the hose, comprising 20 boxes for ladies hosiery, 3 for men's hosiery, and 24 for children's hosiery.

U. S. Gov., Federal Specifications Board LLL–B–631; 1930. Corrugated Fibre Boxes. For boxes without wooden frames, 1 style of 1-piece box; 4 styles of 2-piece boxes including half-slotted box, design box, design style and taped corner style of telescope boxes; 1 style of 3-piece, triple slide box; designs illustrated. Requirements on construction of corrugated sheets, waterproofing, thickness of fiber sheets, thickness and bursting strength of fiber board, width, weight, and strength of gummed paper strip, width and tearing strength of gummed tape, type of metal fastenings, construction of joints and boxes, methods of testing.

U. S. Gov., Federal Specifications Board LLL–B–636; 1930. Solid Fiber Boxes. For usual styles of fiber boxes without wooden frames, 1 style of 1 piece box, 3 styles of 2 piece box including half slotted box, design box, and telescope box, illustrated construction of each style, requirements on number and thickness of plies, thickness and bursting strength of solid fiber board, types of metal fastenings, construction of joints, test of waterproofing, methods of test.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Materials; 1930. Container Spec. 2G. Fiber Cans and Boxes. As inside containers for shipment of dangerous materials, mandatory requirements on construction, thickness of materials, attachment of tops and bottoms, strength of materials, for capacities of 3 to 5 pounds, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 23A, 23B, 23C, 23D, and 23E. Solid Fiberboard Boxes. Mandatory requirements on number of plies, thickness of material, strength, waterproofing, construction, dimensions of parts, for 1 or 3 piece boxes, inside packing requirements, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 24A, 24B, 24C, and 24D. Corrugated Fiberboard Boxes. Mandatory requirements on materials, construction, thickness, strength, and waterproofing of corrugated fiberboard, construction of box and dimensions of parts for one piece of triple slide construction, inside packing requirements, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 25A. Hardened Fiber Boxes. Mandatory requirements on limiting capacity, thickness and strength of box parts, tests of waterproofness and oilproofness of fiber, construction of box for use with rectangular metal inside containers, drop test, dangerous materials for which authorized.

References.—Paperboard and paper cartons. *See also* 954.1. Standard boxboard thicknesses. *See* 472.0. Lined boxboard, corrugated boxboard, fibreboard. *See also* 472.16, 472.25, 472.93. Methods of testing paper and paperboard. *See* 470.3. Gummed paper. *See also* 479.2.

953.3 WOODEN BOXES

953.30 General Items

American Society for Testing Materials. Tentative Specifications D 68–22T; 1922. General Specifications for Wooden Boxes, Nailed and Lock Corner Construction. Suitable woods grouped into 4 groups, permissible number of pieces in sides, use of corrugated fasteners, length, size, and spacing of nails for different kinds of wood, size and attachment of strapping, general box construction.

American Society for Testing Materials. Tentative Specifications D 118–21T; 1921. General Specifications for 4-One Boxes and Similar Type Boxes. Covers 3 types, general form, boxes with wedglock ends, boxes with detached tops. Sides of thin boards and cleats held together by binding wire and assembled around separate end boards, grouping of suitable woods, minimum thickness of wood parts and wire, assembly and stapling requirements.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 1. Boxes. For wooden boxes, general requirements for closeness of fit of parts, and for strapping and cleat reinforcement for large boxes.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Stitched Covers. For 33 varieties of stitched covers for lugs, lettuce, melon, orange, apple, pear, and peach covers, requirements on number and dimensions of cleats and slats.

National Assn. of Wooden Box Manufacturers. Charts for Correct Nailing of Wood Boxes; 1928. Sizes and number of nails per side for cement coated nails for various thicknesses of sides and ends.

National Assn. of Wooden Box Manufacturers. Wooden Box and Crate Construction; 1921. Book of 200 pages containing information on kinds of lumber, properties of wood influencing its use for box construction, box and crate design.

U. S. Gov., Dept. of Agriculture. Farmers Bulletin No. 1579; 1929. Containers Used in Shipping Fruits and Vegetables. Not a standard or specification, but a descriptive list of containers most favored by the important shipping sections of the country for shipment of apples, artichokes, asparagus, avocadoes, beans, berries, cabbage, cantaloupes, misc. melons, cauliflower, celery, cherries, citrus fruit, cranberries, green corn, cucumbers, figs, grapes, lettuce, mushrooms, okra, onions, peaches, pears, peas, peppers, pineapples, plums, prunes and apricots, potatoes, sweet potatoes, rhubarb, tomatoes, misc. foliage type and misc. root type vegetables.

953.31 Fruit Boxes

American Railway Assn. Freight Container Bureau. Tentative Specification. Circular No. 16; 1924. Boxes (Lugs) for Fresh Grapes. Inside dimensions and capacity, dimensions of individual parts, general quality of lumber, type of nails, nailing and making up requirements.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Cherry Boxes and Lugs. For 22 varieties, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Dried Fruit Boxes. For 34 varieties of boxes for dried fruit, peaches, prunes, apricots, and figs for domestic and export shipment. Requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Evaporated Apple Boxes. For 5 varieties of 25 and 50 pound boxes, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Fresh Fig Boxes. For 16 varieties of single and double layer filler type, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Fresh Prune Boxes. For 3 varieties, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1. Box and Crate Specifications. 1928. Green Apple Boxes. Requirements on number and dimensions of pieces for 46 types, divided into light, medium, heavy, and export boxes and half boxes.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1; 1928. Box and Crate Specifications. Lemon Boxes. For 15 varieties of boxes and half boxes, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1; 1928. Box and Crate Specifications. Orange and Grapefruit Boxes. For 8 varieties, California standard and export types, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1; 1928. Box and Crate Specifications. Peach Boxes. For 18 varieties, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1; 1928. Box and Crate Specifications. Pear Boxes. For 32 varieties of boxes and half boxes, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1; 1928. Box and Crate Specifications. Picking Boxes. For 38 varieties and sizes of picking boxes for various products, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1; 1928. Box and Crate Specifications. Raisin Boxes. For 21 varieties of layer, loose, carton, and bag raisin boxes, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1; 1928. Box and Crate Specifications. Sweat Boxes. For 3 varieties, requirements on number and dimensions of component pieces.

Standard Container Mfrs., E. H. Dulaney, Agent for Southeastern Railroads. Standard Containers for Fresh Fruits and Vegetables and Loading Rules No. 5; 1928. Citrus Fruit Crate. Requirements on standard inside dimensions, dimensions of parts, details of construction and nailing, kinds and quality of wood, permissible bulge when packed.

Standard Container Mfrs., E. H. Dulaney, Agent for Southeastern Railroads. Standard Containers for Fresh Fruits and Vegetables and Loading Rules No. 5; 1928. Peach Boxes. Requirements on thickness of box shook used, permissible maximum dimensions of box.

References.—Fruit crates. *See* 954.31. Grading rules for box lumber. *See* 413.9. Box shook and crating, nails. *See also* 421.4, 608.1. Box construction, nailing, cover construction. *See also* 953.30. Shipping boxes. *See also* 953.39.

953.32 Berry Boxes

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Berry Baskets or Boxes. Requirements on standard sizes, allowable tolerances on correctness of capacities.

References.—Cranberry boxes. *See* 953.34.

953.33 Vegetable Boxes

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1. Box and Crate Specifications; 1928. Artichoke Boxes. Requirements on number and dimensions of component pieces for 6 types of boxes and half boxes.

References.—Grading rules for box lumber. *See* 413.9. Box shook and crating, nails. *See also* 421.4, 608.1. Box construction, nailing, cover construction. *See also* 953.30. Shipping boxes. *See also* 953.39.

953.34 Cranberry Boxes

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 215; 1930. Wooden Boxes for shipment of cranberries. For half-barrel and quarter-barrel sizes, requirements on thickness of sides, cleats, or of frame and panel. Construction required in order to be given a certain freight rate.

References.—*See* references under 953.33.

953.35 Produce (Lug) Boxes

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Lugs, Display and Lug Boxes. For 41 varieties, requirements on number and dimensions of component pieces.

References.—*See* references under 953.33.

953.36 Special Shipping Boxes

American Bottlers of Carbonated Beverages Educ. Bull. No. 4; 1930. Bottle Boxes. For wooden boxes for holding twenty-four 6½ to 9 ounce bottles, requirements on thickness of ends, sides, bottoms, and partitions, dimensions of metal straps.

American Railway Assn. Freight Container Bureau. Tentative Specification. Circular No. 3; 1922. Wooden Boxes for Boots and Shoes. Strapping and nailing requirements, permissible moisture content and defects of lumber, kinds of wood grouped according to strength and nail holding power, dimensions of parts and strapping, construction of boxes.

American Railway Assn. Freight Container Bureau. Tentative Specification. Circular No. 4; 1923. Wooden Boxes for Eggs in the Shell and Inside Packing. For center partitioned boxes, thickness, weight and Mullen test for fiber board fillers and flats, dimensions, construction and weight of fillers and flats, construction of excelsior pads, kinds of lumber, permissible moisture content and defects, dimensions, construction and nailing of egg cases.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 110; 1930. Boots or Shoes, Ratings. For Wooden Packing Boxes. Requirements on packing of shoe cartons, types of nails and nailing, strapping, kinds of wood, dimensions of parts, sizes of nails and straps, construction of cleated, wire-bound, and plywood boxes.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 149; 1930. Cheese, Rating. For Cylindrical Cheese Boxes or Drums. As wooden outside containers, requirements on thickness of material, dimensions of hoops, rims, reinforcements, construction of box, fastening of top.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 153; 1930. Cigarettes, Rating. Wooden Boxes for packages of cigarettes, requirements on construction, nailing, strapping, cording, wire binding for various type boxes.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 154; 1930. Cigars, Rating. Wooden Boxes for Cigars. Requirements on nailing, cording, strapping, and reinforcing for various types of boxes.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 183; 1930. Eggs, Rating. Standard Wooden Egg Case. For hardwood case, requirements on thickness of parts, cleats, and partition, construction and nailing, material, thickness, number and weight of fillers and cushions, construction and weight of cupped trays.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 307; 1930. Liquors, Alcoholic, Ratings. Wooden Boxes for packing, requirements for type of nails, strapping or wiring and sealing of straps or wires.

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Nailed Wooden Crates and Boxes. For boxes, classification of woods, requirements on thickness for boxes of various capacities of various woods, on widths of material, surfacing, joining, nailing, size of nails, dimensions and construction of wooden or fiber boxes for various weights of lard or lard cartons.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1. Box and Crate Specifications; 1928. Butter Cases. For 9 sizes and types (cube, print, carton, etc.), requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Cheese Boxes. For 2 grades, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Egg Cases. For 30 dozen ventilated and nonventilated standard types, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Honey Cases. For 5 varieties, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Oil Cases. For 4 varieties, requirements on number and dimensions of component pieces.

Pacific States Butter, Egg, Cheese, and Poultry Assn. Standard Butter Cube; 1927. Requirements on color and general quality of wood, thickness and finish of sides, dimensions of cube, nailing, paraffining, size and saturation of paper liners, and packing.

U. S. Gov., Federal Specifications Board EE–S–571; 1930. Baking Soda. Includes packing boxes for shipment of thirty-six 1-pound cartons, requirements on grade of box lumber, minimum thicknesses of ends, sides, tops, and bottoms, sizes of nails, sizes and strength of binding wire or strap, tolerances on size, for nailed construction, and for 4-one box construction.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 14. Wooden Boxes. For nailed boxes, nailed boxes with cleats, and lock corner boxes, mandatory requirements on general quality and thickness of lumber, construction, and nailing for various weight capacities, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 15A, 15B, 15C, and 15D. Wooden Boxes, Nailed. For nailed boxes without cleats, for single cleated boxes, for double cleated boxes, and for lock corner boxes, mandatory requirements on general quality of lumber, construction, dimensions of parts, size of nails and nailing, strapping, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 16A and 16B. Wooden Boxes, Wire-bound. Mandatory requirements on general quality of lumber, strength of binding wire or strap, construction, dimensions of parts, number and size of binding wires, types of nails and nailing, setting up and closing, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 19A. Wooden Boxes, Glued Plywood. Mandatory requirements on general quality of lumber, number of plies, construction, nailing and size of nails, width of cleats, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 30. Wooden Boxes, Metal Lined. For zinc lined boxes, mandatory requirements on thickness and construction of lining, construction and dimensions of parts of double cleated boxes of various capacities, nailing, dangerous materials for which authorized.

References.—Shipping boxes for canned foods. *See* 953.37. Outside containers for boxed carboys. *See* 955.2. Grading rules for box lumber. *See* 413.9. Box shook and crating, plywood. *See also* 421.4, 413.52. Box construction, nailing, cover construction. *See also* 953.30. Nails. *See also* 608.1. Plywood. *See also* 413.52. Wooden shipping boxes. *See also* 953.39.

953.37 Wooden Boxes for Canned Goods

American Society for Testing Materials. Tentative Specifications D 44–20T; 1920. Wooden Boxes, Nailed and Lock-Corner Construction, for the Shipment of Canned Foods. Minimum thicknesses of material for box parts, maximum weight of box and contents, permissible variation in inside dimension requirements, other requirements in accordance with A. S. T. M. specification D 68.

American Society for Testing Materials. Tentative Specifications D 45–17T; 1917. Canned Foods Boxes, Wirebound Construction. Veneer and cleat construction, requirements on manufacture and permissible defects in lumber, dimensions of cleats and wires, thickness of sides, construction of boxes, for gum veneer sides and 13 kinds of wood permitted for cleats, for 2-dozen can boxes.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; Box and Crate Specifications; 1928. Cannery Cases. For 71 sizes and types for various numbers and sizes of round and square cans for fruit, asparagus, vegetables, picnic, oysters, sardines, prunes, pimento, and milk. Requirements on number and dimensions of component pieces.

National Canners Assn. Canned Food Boxes; 1928. For nailed wooden boxes, lock corner wooden boxes, and 4-one wooden boxes, requirements on capacities measured in standard size cans, tolerances on dimensions, grouping of box woods, requirements on construction, thickness of parts, cleating, and nailing for boxes constructed under each group, for domestic and export trade.

U. S. Gov., Federal Specifications Board Z–F–351; 1931. Canned Figs. Includes packing boxes for the canned goods, requirements on construction, thickness of parts, type and sizes of nails, size and strength of strapping for nailed box construction and for 4-one box construction.

U. S. Gov., Federal Specifications Board JJJ–O–361; 1930. Vegetable Salad Oil. Includes specifications for shipping cases. For nailed construction, requirements on thickness of ends and sides, size of nails, size and tensile strength of binding wire or steel straps, strapping. For 4-one box construction, requirements on quality of lumber, thickness of boards and cleats, size of wire and staples, construction and nailing.

U. S. Gov., Federal Specifications Board JJJ–S–351; 1930. Sirup. Includes wooden packing cases for shipment of canned or bottled sirup, requirements on thickness of ends and sides, size of nails, strapping, size and strength of metal strap or wire, for nailed box construction. Requirements on quality of lumber, thickness of boards, cleats, wires, and staples for 4-one box construction.

References.—Grading rules for box lumber. *See* 413.9. Box shook, nails. *See also* 421.4, 608.1. Box construction, nailing, cover construction. *See also* 953.30. Boxes suitable for canned goods. *See also* 953.39.

953.39 Miscellaneous Wooden Boxes

U. S. Gov., Federal Specifications Board NN–B–601; 1930. Wood Boxes, Cleated-Plywood Construction. Covers 11 box styles, 4 styles of which have 3-way corner construction intended to be furnished under this specification, requirements on thickness and construction of plywood and of cleats for various types of wood and weight capacities, nailing requirements and size of nails, illustrated constructions.

U. S. Gov., Federal Specifications Board NN–B–621; 1930. Wood Boxes, Nailed and Lock Corner. Designs and construction for 6 styles of nailed boxes and 1 style of lock corner, formulas and charts for determining minimum thicknesses of sides and size of straps dependent on weight of box and contents, requirements on joint construction, sizes and dimensions of nails, nailing, types and strengths of strapping, permissible size of knots.

U. S. Gov., Federal Specifications Board NN–B–631; 1930. Wood Boxes, Wire-Bound. Available species of wood, permissible defects in lumber, requirements on sizes of nails, staples, and reinforcing wires, permissible variations in thickness of boards and cleats, application of binding wires, thickness of thin boards, reinforcement by cleats and battens, size and spacing of binding wire, box construction.

References.—Plywood and veneer. *See also* 413.52. Grading rules for box lumber. *See* 413.9. Box shook, nails. *See also* 421.4, 608.1.

953.9 MISCELLANEOUS BOX SPECIFICATIONS

References.—Battery boxes. *See* 712.3.

954. CARTONS, CASES, CRATES, AND TUBES

954.1 CARTONS

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 509; 1930. Bicycles, Ratings. Cartons for shipment of bicycles, requirements on thickness and Mullen test resistance, packing of bicycle.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 102; 1930. Blackboards and Desks combined, Rating. Carton for shipment of combined desks and blackboards, of solid fibreboard, requirements on thickness and Mullen strength test.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 388; 1930. Envelopes, Ratings. For solid fiberboard cartons for shipment of envelopes, of telescopic construction, requirements on thickness and strength of fiberboard, and on width and strength of the paper sealing tape.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, pp. 227 to 230, 233 to 239, 241; 1930. Furniture, Ratings. Fiberboard Cartons for packing various pieces of furniture, requirements on thickness, Mullen test strength, and structural features.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 383; 1930. Paper, Ratings. Cartons for shipment of paper made of solid fibreboard or double-faced corrugated strawboard or fiberboard, requirements on strength of board, thickness of board, thickness of liners, width and strength of paper sealing tape.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 163; 1930. Refrigerators, Ratings. Fiberboard Packages for shipment of refrigerators, requirements on number of ply, thickness of board, Mullen test strength, sealing of flaps, provision of skids.

Institute of American Meat Packers. Packinghouse Supplies, Packs and Equipment; 1928. Sausage, Lard, and Sliced Bacon Cartons. For rectangular paper cartons up to 10 pounds capacity, requirements on dimensions, kind and thickness of paper stock.

U. S. Gov., Dept. of Commerce, Bureau of Standards R120–31. 1931. Ice Cream Brick Molds and Cartons. For machine filled cartons, simplified practice recommended and accepted by industry establishing dimensions of 2 standard pint cartons and 2 standard quart cartons.

U. S. Gov., Interstate Commerce Commission Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2C. Corrugated Fibreboard Cartons. As inside containers for shipment of dangerous materials, mandatory requirements on construction and strength of the fibreboard, construction of carton, lining of outside containers, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2H. Cartons. As inside containers for shipment of dangerous materials, mandatory requirements on use of double face corrugated fibreboard, strength of fibreboard, types of construction, construction of joints, dangerous materials for which authorized.

References.—Fibreboard boxes. *See also* 953.2, Standard boxboard thicknesses. *See* 472.0. Lined boxboard, corrugated boxboard, fiberboard. *See also* 472.16, 472.23, 472.93. Methods of testing paper and paperboard. *See* 470.3. Gummed paper. *See* 479.2.

954.2 CASES

954.21 Metal Cases

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 32A, 32B, and 32C. Metal Cases and Trunk. For shipment of motion picture films, mandatory requirements on thickness of metal and construction of riveted or seamed sheet iron or steel cases for 8 reels and of welded or riveted cases for 12 reels, construction of compartments and metal lining of trunk, general quality, thickness, weight, and construction of fibreboard lining of cases, drop test of cases.

U. S. Gov., Treasury Dept. U. S. Public Health Service. Reprint No. 425; 1917. A New Water Sample Shipping Case. Dimensions and design of metal shipping case insulated with corkboard for shipment of bottled samples of water for bacteriological examination, with space provided for cracked ice packing.

References.—Iron and steel sheets. *See* 604.2. Standard box board thicknesses. *See* 472.0. Lined boxboard, fibreboard. *See also* 472.16, 472.93.

954.22 Paper and Fiber Cases

954.29 Miscellaneous Cases

American Railway Assn. Signal Section 8820; 1921. Lead Type Portable Storage Battery for Signaling. Includes wooden outer case and case cover, of oak, maple, beech, birch, or ash, dimensions, construction and assembly, size and application of reinforcement strap and bolt, bail handle and painting requirements.

954.3 CRATES

954.30 General Items

American Railway Assn. Freight Container Bureau. Bulletin No. 6; 1927. The A. B. C. of Good Crating. General information on crating for shipment of articles, moisture content of lumber, methods of nailing, and construction of crates illustrated.

American Railway Assn. Freight Container Bureau. Bulletins 9 and 10. The Three Way Corner, The Three Way Corner Crate; 1927. Illustration of construction and nailing, method of disassembly and advantages.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 2. Crates. General requirements on quality of material, protection of exposed parts, reinforcement, protection of contents.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Stitched Covers. For 33 varieties of stitched covers for lugs, lettuce, melon, orange, apple, pear, and peach covers, requirements on number and dimensions of cleats and slats.

National Assn. of Wooden Box Manufacturers. Wooden Box and Crate Construction; 1921. Book of 200 pages containing information on kinds of lumber, properties of wood influencing its use for box construction, box and crate design.

954.31 Fruit Crates

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1. Box and Crate Specifications; 1928. Banana Cases. For 4 sizes of octagonal cases, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Fresh Fig Boxes. Includes 2 varieties of crates of basket style, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Fresh Prune Crates. For 4 varieties of 4 basket crates, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Grape Crates. For 40 varieties, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Melon Crates. For 33 varieties of cantaloupe, honey dew, and casaba melon crates, requirements on number and dimensions of component pieces.

Standard Container Mfrs. Bushel Crate; 1930. Requirements on standard inside dimensions, dimensions of parts, details of construction and nailing, kinds and quality of wood. Used for fruits and vegetables.

Standard Container Mfrs. Cantaloupe and Musk Melon Crate. Undated. For standard crate, pony crate, and standard flat cantaloupe crate, requirements on standard inside dimensions, dimensions of heads, panels, slats, construction and nailing, kinds and quality of wood.

Standard Container Mfrs. Citrus Fruit Crates. Undated. Requirements on standard dimensions of standard crate and of tangerine crate, dimensions and construction of heads, panels, sides, cleats, nailing and make-up, kinds and general quality of wood, permissible bulge when packed.

Standard Container Mfrs. Pineapple Crate. Undated. Requirements on standard inside dimensions, number and dimensions of heads, panels, slats, details of construction and nailing, kinds and quality of wood.

References.—Basket crates. *See* 954.35. Crate construction and crating, cover construction. *See also* 954.30. Grading rules for box lumber. See 413.9. Box shook and crating, nails. *See also* 421.4, 608.1. Drying trays for raisins and fruits. *See* 959.9.

954.32 Berry Crates

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1. Box and Crate Specifications; 1928. Berry Boxes and Crates. For 14 sizes and types of strawberry, raspberry, and currant crates, drawers, and covers, requirements on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. For 2 sizes of 30-pound canned berry crates, requirement on number and dimensions of component pieces.

References.—Basket crates. *See* 954.35. Crate construction and crating, cover construction. *See also* 954.30. Grading rules for box lumber. *See* 413.9. Box shook and crating, nails. *See also* 421.4, 608.1.

954.33 Vegetable Crates

National Assn. of Wooden Box Manufacturers. Pacific Coast Division. Tariff No. 1. Box and Crate Specifications; 1928. Asparagus Crates.

For 9 types of pyramid and flat crates, requirement on number and dimensions of component pieces.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Sweet Potato Crates. For 7 varieties, requirements on number and dimensions of component parts.

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1; 1928. Box and Crate Specifications. Vegetable Crates. For 87 varieties of cauliflower, lettuce, pea, pepper, spinach, celery, and cabbage crates, requirements on number and dimensions of component pieces.

Standard Container Mfrs., E. H. Dulaney, Agent for Southeastern Railroads. Standard Containers for Fresh Fruits and Vegetables and Loading Rules No. 5; 1928. Asparagus Crate. Requirements on standard inside dimensions, dimensions of parts, details of construction and nailing, kinds and quality of wood.

Standard Container Mfrs. Bushel Crate; 1930. Requirements on standard inside dimensions, dimensions of parts, details of construction and nailing, kinds and quality of wood. Used for potatoes, cucumbers, onions, and other fruits and vegetables.

Standard Container Mfrs. Florida Cabbage Barrel Crate; 1931. Requirements on standard inside dimensions, dimensions of head frames, panels, slats, construction and nailing, kinds and quality of wood. For shipment of cabbage, squash, eggplant, beets, cauliflower, etc.

Standard Container Mfrs. Florida Celery Crate; 1931. Requirements on standard inside dimensions, dimensions of headframes, panels, and slats, construction and nailing, kinds and general quality of wood.

Standard Container Mfrs. Florida Lettuce Crate. Undated. Requirements on standard inside dimensions, dimensions and number of heads, panels, slats, and cleats, construction and nailing, kinds and general quality of wood.

Standard Container Mfrs. One and One-Half Bushel General Utility Crate; 1930. Requirements on standard inside dimensions, dimensions of parts, details of construction and nailing, kinds and quality of wood.

Standard Container Mfrs. Standard Five Peck Crate; 1930. Requirements on standard inside dimensions, dimensions of parts, details of construction and nailing, kinds and quality of wood.

Standard Container Mfrs., E. H. Dulaney, Agent for Southeastern Railroads. Standard Containers for Fresh Fruits and Vegetables and Loading Rules No. 5; 1928. Pepper Crate. Requirements on standard inside dimensions, dimensions of parts, details of construction and nailing, kinds and quality of wood. For peppers and egg plants.

U. S. Gov., Federal Specifications Board HHH–P–611; 1930. Irish Potatoes. Includes crates for shipping potatoes, requirements on quality of box lumber, inside dimensions of octagonal crate for 160 pounds capacity, thickness, dimensions, number of slats, and construction of ends and sides, nailing and strapping, strength of strap or binding wire.

References.—Basket crates. *See* 954.35. Crate construction and crating, cover construction. *See also* 954.30. Grading rules for box lumber. *See* 413.9. Box shook and crating, nails. *See also* 421.4, 608.1.

954.35 Basket Crates

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circular No. 18; 1925. Four Basket Crates with Tapered Ends for Fresh Fruits and Vegetables. For 3-quart baskets, permissible moisture and defects of lumber for crates, dimensions and construction of parts, nailing requirements, construction of baskets, loading rules for car loading.

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circular No. 19; 1925. Six Basket Crates for Fresh Fruits and Vegetables. For 4-quart baskets, permissible moisture and defects in lumber for crates, dimensions and construction of parts, nails and nailing requirements, construction of baskets, loading rules.

Standard Container Mfrs., E. H. Dulaney, Agent for Southeastern Railroads. Standard Containers for Fresh Fruits and Vegetables and Loading Rules No. 5; 1928. Three Basket Crate for Tomatoes. For three 4-quart till baskets, of pine or gum veneer or sawed wood, requirements on inside dimensions, dimensions of cleats, sides, etc., details of construction and nailing.

Standard Container Mfrs. Six Basket Crate. Undated. For shipment of tomatoes, peaches, plums, peppers, okra, persimmons, guavas, avacado pears, grapes, etc., requirements on standard inside dimensions, number, dimensions, and construction of heads, panels, slatted sides, top, bottom, baskets, trays, requirements on nailing, kinds and general quality of wood. Covers 10 and 10½ inch height standard crates.

References.—Fruit and vegetable baskets. *See* 952.11. Crate construction and crating, cover construction. *See also* 954.30. Grading rules for box lumber. *See* 413.9. Box shook and crating. *See also* 421.4. Nails. *See also* 608.1. Drying trays for raisins and fruits. *See* 959.9.

954.36 Shipping Crates

American Railway Assn. Freight Container Bureau. Bulletin No. 5; 1926. Crates for Parlor Heaters. Bulletin No. 7; 1926. Packing and Crating Oak Heaters. Bulletin No. 8; 1926. Crates for Cast-Iron Warm-Air Furnaces. Information and illustrated construction of recommended types of crating for the heaters covered.

American Railway Assn. Freight Container Bureau. Bulletins No. 11 to No. 17; 1927 and 1928. Recommended Crates for Furniture. Illustrated construction and method of packing various types of furniture, sizes of nails.

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circulars No. 5, No. 10, No. 12; 1923. Crates for Furniture (Case Goods), Crates for Furniture and Lamps (Reed and Fiber), Crates for Upholstered Furniture. Quality and weight of wrapping paper, permissible moisture content, defects, and types of wood for crating lumber, minimum dimensions of parts, nails and nailing, crating requirements.

American Railway Assn. Freight Container Bureau. Tentative Specification. Circular No. 7; 1923. Crates for Refrigerators. Permissible moisture content and defects in lumber, minimum size of lumber, spacing of sheathing, construction of crate, nails and nailing requirements.

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circular No. 9; 1923. Cans for Eggs (Shelled and Frozen) and Outside Containers. Includes crates for cans, suitable kinds of wood classed according to strength and nail holding power, dimensions of pieces, sizes and type of nails, nailing and construction of crates recommendations.

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circular No. 15; 1924. Crates for Gas and Electric Domestic Cook Stoves. Circular No. 17; 1925. Crates for Oil Cook Stoves. Circular No. 20; 1926. Crates for

Cast Iron Cook Stoves and Ranges. Mullen test requirements for paper and strawboard used in wrapping and packing parts, woods for crates grouped according to strength and nail holding power, permissible moisture and defects in lumber, dimensions of crate parts, size and type of nails and nailing requirements, construction of corners, bracing, and illustrated design of crates and method of packing.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 220; 1930. Furniture, Rating. Crates for packing furniture. Requirements on dimensions of frame and bracing members for various weights of crates and contents, provision of protecting strips, thickness of strips, nailing and three way corner construction. Requirements for wire bound construction.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 266; 1930. Graphite Articles, Rating. Cylindrical Crates for packing. Requirements on maximum dimensions, minimum thickness of hardwood, dimensions and spacing of side slats, reinforcement and lining of crate.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 102; 1930. Slate Blackboards, Rating. Crates, for shipment of blackboards, requirements on width and thickness of parts and slats, permissible size of apertures, size and location of reinforcement strips, general quality of wood.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 510; 1930. Vehicles, Horse-Drawn, Ratings. Crates for packing vehicles, requirements on height of package, thicknesses of hardwood or softwood materials, corner construction, sum of widths of slats on sides and on ends of package, layout and attachment of slats.

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Nailed Wooden Crates and Boxes. For crates, dimensions of crate and of cleats, thicknesses of sides, ends, etc., number of pieces, size and number of binding wire for wire bound crates, above requirements given for various weight capacities of nailed and of wire bound lard can crates, and of pork and smoked meat crates.

National Furniture Warehousemens Assn. Household Goods, Packing and Shipping Specifications. Undated. Recommendations on padding, wrapping, packing, and crating, itemized lists of kinds and amounts of materials needed for packing and crating each of many kinds of furniture and household articles.

References.—Crate construction and crating. *See also* 954.30. Box shook and crating. *See also* 421.4. Nails. *See also* 608.1. Lined boxboard, corrugated boxboard, fibreboard. *See also* 472.16, 472.23, 472.93. Wrapping paper. *See also* 477.

954.39 Miscellaneous Crate Specifications

954.4 TUBES AS CONTAINERS

U. S. Gov., Interstate Commerce Commission. Regulations for Transportion by Rail of Dangerous Articles; 1930. Container Spec. 29. Mailing Tubes. For 1 pint capacity or smaller for shipment of dangerous materials, mandatory requirements on thickness of tube walls, provision of metal bottom and metal screw cap.

U. S. Gov., Post Office Dept. U. S. Official Postal Guide, p. 21; 1930. Mailing Tubes for single glass bottle containing liquid. Postal regulations covering requirements on wall thickness for wood or papier-mâché tube or block for various capacity bottles, watertightness, provisions of screw top requiring 1½ turns to disengage.

955. BOTTLES, CARBOYS, FLASKS, JARS, AND DEMIJOHNS

955.0 GENERAL ITEMS

Glass Container Assn. of America. Glass Finish and Gauges; 1930. Dimensioned drawings showing standard designs of glass bottle and jar top finishes for attachment of tops, caps, lids, etc., drawings of diameter gauges, for more than 30 finishes.

955.1 BOTTLES

American Bottlers of Carbonated Beverages. Educ. Bull. No. 4; 1930. Bottle Simplification. Recommended practice on sizes of bottles as a result of a conference under auspices of Div. of Simplified Practice of Nat. Bureau of Standards, standard capacities, main dimensions, and weight of glass for soda and imported ginger ale shapes, water and water shape ginger ales, beers, export, select or C. S. shape.

American Bottlers of Carbonated Beverages. Educ. Bull. No. 4; 1930. Crown Finish for Beverage Bottles. Standard dimensions and shape of bottle top, identical with No. 600 glass finish of the Glass Container Assn.

American Drug Manufacturers Assn. Standardized tablet bottles; 1923. Dimensional drawings of standard Blake tablet bottles from ⅛ to 28 ounce sizes.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 255; 1930. Bottles, Demijohns, Jars. Requirements on minimum weight of glass for various capacities up to one-half gallon, in order to be acceptable for shipment in carload lots.

Manufacturing Chemists Assn. of the U. S. Laboratory Apparatus; 1922. Weighing Bottles. For flat bottom bottles with ground glass stoppers, standard sizes, requirements on design and dimensions.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Lubricating-Oil Bottles. For glass bottles used for selling lubricating oil, permissible heights for various sizes, requirements on marking of capacity and provision of filling mark, tolerances permitted on capacity. Amendment adopted at 23rd Conference (Publ. M116 of Bur. of Stan. 1930) covers over-all height and filling line indication for bottles with permanently attached spouts.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Milk Bottles. Requirements on permissible sizes, marking of capacity and maker's name on bottle, height of filling, tolerances on capacity permitted.

U. S. Gov., Dept. of Commerce, Bureau of Standards R10; 1927. Milk and Cream Bottles and Bottle Caps. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes, capacities, and dimensions of milk and cream bottles and sizes of caps for these bottles.

U. S. Gov., Dept. of Commerce. Bureau of Standards. R 123–30; 1930. Carbonated Beverage Bottles. Simplified practice recommended and accepted by industry establishing a limited number of standard sizes and types of bottles, includes standard capacities, heights, diameters, and weight of glass, for small and large types of soda and imported ginger ale shapes; water and water shape ginger ales; beers, export, select, or C. S. shapes; recommended that contents clause or capacity be blown in glass of soda bottles.

References.—Bottle top finishes. *See also* 955.0. Vinegar bottle for table use. *See* 523.1. Sealing wax for bottles. *See* 719.59.

955.2 CARBOYS

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 9. Glass Carboys. General requirements on enclosing of carboy in wooden box with cushioning material.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 1A. Boxed Carboys (Glass, Earthenware, Clay, or Stoneware). Mandatory requirements on type of closure or stopper, stopper fastening devices, capacities, weight of glass in glass carboy, thickness of side walls, construction, thickness of box sides, and nailing requirements for wooden box container, swing shock tests, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 1B. Boxed Lead Carboys. Mandatory requirements on internal pressure test, capacities, construction, quality of lead used, weight of lead per unit area in walls and top, construction, thickness of box sides, and nailing requirements for wooden box container, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 28. Metal Jacketed Lead Carboys. Mandatory requirements on thickness of lead in various parts of carboy, size of neck, material and size of closure, capacity, drop test, and for outside container, requirements on gage of metal, construction, handles, etc., dangerous materials for which authorized.

References.—Sheet lead, methods of analysis of lead. *See* 651.5. 651.0.

955.3 FLASKS

References.—Laboratory flasks. *See* 918.9.

955.4 JARS

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 255; 1930. Bottles, Demijohns or Jars. Requirements on minimum weight of glass for containers of capacities up to one half gallon, in order to be acceptable for shipment in carload lots.

U. S. Gov., Dept. of Commerce, Bureau of Standards R91–29; 1929. Glass Containers for Preserves, Jellies, and Apple Butter. Simplified practice recommended and accepted by industry, limits the stock sizes of preserve and apple butter jars and jelly tumblers to the content capacities given in the list in the publication.

References.—Jar top finishes. *See also* 955.0. Jar for water cooler. *See* 955.6. Rubber jar rings. *See* 208.6. Sealing wax for jars. *See* 719.59.

955.5 DEMIJOHNS

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 255; 1930. Bottles, Demijohns, Jars. Requirements on minimum weight of glass for various capacities up to one-half gallon, in order to be acceptable for shipment in carload lots.

955.6 WATER COOLERS

U. S. Gov., Federal Specifications Board 617; 1929. Water Coolers. For metal ice container, inside water jar, glass bottle, and metal stand, requirements on thickness of metal, ice capacity, and structural features of ice container, glazing of porcelain or earthenware water jar, type, material, and finish of faucets, construction and finish of stand.

955.7 JUGS

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 31. Jugs in Tubs. Mandatory requirements on capacity and acid resisting quality of jug, dimensions of hoops and hardwood staves of tub, spacing between jug and tub, dangerous materials for which authorized.

956. CYLINDERS AND TANKS

956.1 CYLINDERS AS CONTAINERS

Compressed Gas Manufacturers Assn. Safe Handling and Use of Compressed Gas Cylinders. Undated. General rules and precautions applicable to individual gases as oxygen, acetylene, combustible gases, carbonic gas, sulphur dioxide, chlorine, and anhydrous ammonia.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 3A, 3B, 3C, 3D, and 3E. Seamless Steel Cylinders. For shipment of gases and other dangerous materials, mandatory requirements on type and general quality of steel used, chemical composition of steel, designed pressures, thickness of walls, permissible stress in material, design formula, protection of safety devices, hydrostatic test, flattening test, tensile test, for cylinders for various pressures up to 500 pounds, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 4, 4A, 4B, and 4C. Welded Steel Cylinders. For shipment of gases and other dangerous materials, mandatory requirements on general quality and chemical composition of steel, construction, protection of safety devices, hydrostatic test, flattening test of crop end, tensile test, for 300 and 500 pound cylinders, dangerous materials for which authorized. 4B and 4C cylinders to be of welded or brazed construction.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 8. Steel Cylinder. For shipment of acetylene gas, mandatory requirements on chemical composition of steel, construction of seamless cylinder, protection of connections, porosity of porous filling material, hydrostatic test, service tests, and tensile tests.

References.—Methods of testing and general requirements for metals. *See also* 600.1. Regulators and valves for cylinders. *See also* 607.6, 645.4.

956.2 TANKS

American Bureau of Shipping. Rules for Building and Classing Steel Vessels; 1930. Air Containers. Steel containers for spray air, injection air, starting air for internal combustion engines, etc., requirements on flattening, tensile, and hydrostatic tests, on design formulas for shell, curved or flat heads, for seamless, lap-welded, or riveted types.

American Marine Standards Committee. E No. 26–1929. Marine Boilers and Pressure Vessels.

For air containers and other nonfired pressure vessels, required formulas to be used in design of both riveted and welded types.

American Railway Engineering Assn. 1929 Manual. Water Service and Sanitation. Wooden Water Tank; 1920. 50,000 and 100,000 gallon capacities, of cypress, redwood, white pine or specified wood, dimensions of tank, staves, and plank, for cylindrical tanks, assembly, minimum size, spacing and stress allowable for tank hoops, dimensions and construction of 12 post timber or steel substructures.

American Society of Bakery Engineers. Bulletin 43; 1929. Water Tanks. Volume per pound of water for standard straight round water tanks of noncorrosive material.

American Society of Mechanical Engineers. Boiler Construction Code; 1931. Section VIII. Unfired Pressure Vessels. Requirements for safety valves, allowable design stresses in materials, construction and allowable working pressures of vessel, riveted joints, dished heads, braced and stayed surfaces and openings, vessel supports, hydrostatic test, rules for fusion welding and forge welding, requirements for enameled vessels.

Associated Factory Mutual Fire Insurance Companies. Gravity Water Tanks and Steel Towers, vol. 1. Structural Details; 1931. For wooden water tanks, standard sizes, form, kinds of lumber permitted for staves and bottom, hoops and steel shapes according to A. S. T. M. specifications, dead, live, and wind load computations, allowable unit stresses, details of design.

National Board of Fire Underwriters. Finishing Processes other Than Paint Spraying; 1926. Dip tanks, hardening and tempering tanks, flowcoat work, japanning and enameling including ovens. Storage of material, location and arrangement of dipping rooms, requirements on drains, overflows, automatic covers for fire extinguishment, hoods and curtains for various size tanks, arrangement and construction of enameling ovens of brick, concrete or steel and plaster.

National Board of Fire Underwriters. Tanks, Gravity and Pressure, Towers; 1926. Wooden Water Tanks, standard sizes, form, permissible woods, size of supports, iron and steel for hoops, etc., according to A. S. T. M. specifications, design requirements, allowable unit stresses, thickness of staves, construction requirements, accessories and their construction, painting, design and construction of concrete foundations, design of supports on buildings, required pipe connections, minimum sizes, location of valves, valve inclosures and frost protection, construction requirements for steam heating and coal-burning heater installation.

National Conference on Weights and Measures. Commercial Weighing and Measuring Devices. Published as M85 of Nat. Bureau of Standards; 1929. In agreement with standards recommended by Bur. of Standards for adoption by the States. Vehicle Tanks, used as measures. Requirements on provision of indicators, expansion space, venting means, provision for complete delivery, marking of capacity, allowed tolerance on measurement.

National Fire Protection Assn. Suggested Ordinance Regulating Use, Handling, Storage, and Sale of Flammable Liquids; 1926. Includes specifications for steel or iron tanks, above ground and underground types, requirements on thickness of metal, on pressure test for pressure tanks, on strength of steel, general construction of tanks and foundations, venting, location of valves, piping requirements, etc.

Underwriters' Laboratories. Electric Lighting Plants; 1921. Includes fuel tanks for installation at engine, for kerosene, gasoline, or fuel oil, made of copper, brass, or cast iron, capacity, general design, wall thickness, construction of joints, connections, vent openings, pressure test requirements.

Underwriters' Laboratories. Gasoline Stoves for Cooking and Heating; 1928. Includes lift-out tanks and pressure tanks, requirements on general construction, design, thickness of metal, operating characteristics, and pressure test.

Underwriters' Laboratories. Inside Tank Equipment for Oil Burners; 1927. Applies to steel tanks of 275 gallons capacity or less, individual tanks or combined storage tank and gravity tank with pump, form, material and thickness of shell, approved construction in joints and pipe connections, coating requirements, pressure test and strength requirements.

Underwriters' Laboratories. Internal Combustion Engines; 1920. Includes fuel tanks installed at engine, made of copper, cast iron, or protected sheet steel, capacity, general design, wall thickness, construction of joints, connections, vent openings, pressure test requirements.

Underwriters Laboratories. Kerosene Stoves for Cooking and Heating; 1927. Includes fuel tanks, lift out type and pressure type. Lift out tanks of glass, copper, brass or of steel sheets, minimum thickness of sheet material, capacity. Pressure tanks of sheet steel, copper or brass, capacity, working pressure, pressure test requirements, gauge and indicator provisions.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Steel Tanks for Gasoline. Tanks up to 40-gallon capacity for use on passenger vessels, mandatory requirements on seamless or welded construction, thickness of wall, tinning, internal pressure test, vent pipe provisions.

References.—Tank cars, automobile tank trucks. *See* 726.1, 722.1. Steel oil storage tanks, water tanks, pressure tanks. *See also* 605.23. Range boilers, expansion tanks, fuel tanks. *See also* 614.1, 614.3. Concrete fuel oil tanks. *See* 518.71. Steel plates for tanks, rivets. *See* 604., 608.4. Lumber tank stock. *See also* 413.1. Steel tank hoops. *See also* 604.22. Methods of testing, general requirements for metals. *See also* 600.1.

957. BAGS AND SACKS

957.1 CLOTH BAGS AND SACKS

957.11 Fuel Bags

957.12 Mail Bags

957.13 Sand Bags

957.14 Tool Bags

957.19 Miscellaneous Cloth Bags

American Marine Standards Committee. O No. 7–1926. Kinds and Sizes of Mattresses and Pillows and Woolen, Linen, and Cotton Articles for Ship Equipment. Includes laundry bags of white canvas, standard dimensions of one size.

American Society for Testing Materials D 205–27; 1927. Osnaburg Cement Sacks. Requirements, tolerances, and method of test for width, weight, thread count, and tensile strength of material, cut and seam construction of sacks.

American Society for Testing Materials Tentative Specifications D 275–27T; 1927. Cuban (Jute) Raw Sugar Bags. For gunny sacking, requirements for weave, thread count, width, weight, tensile strength, and sizing; for bags, requirements for weight of standard bags, methods of measurement of width and length, test procedure according to A. S. T. M. method D 39.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 507; 1930. Dried Beans, Ratings. Bean Bags for shipment of beans, requirements on standard sizes, minimum weight of cotton cloth or burlap bags, stitches per inch, weight of contents.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 208; 1930. Flour, Rating. Cotton Cloth Bags for edible flour, requirements on standard capacities, width and weight of cloth, width of cut of cloth, tensile strength of warp and filling, method of testing strength.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 261; 1930. Grain Products, Rating. Cotton Cloth Bags for packing corn meal, flour, grits, etc. Requirements on standard sizes of bags, width, weight, and tensile strength of cloth, cut of bag, methods of testing tensile strength.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 479; 1930. Sugar, Ratings. Burlap Bags for packing sugar, requirements on manufacture, weight, width, thread count, and tensile strength.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 479; 1930. Sugar, Ratings. Cotton Cloth Bags for packing sugar, requirements on weight, thread count, and tensile strength.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 479; 1930. Sugar, Ratings. Osnaburg (cotton cloth) Bags for packing sugar, requirements on weight, thread count and tensile strength.

U. S. Gov., Federal Specifications Board SS–S–31; 1930. Table Salt. Includes sacks for shipment of salt, requirements on construction of double sack for 100 pounds, weight and width of burlap for burlap sacks and of Osnaburg cotton for cotton bags.

U. S. Gov., Federal Specifications Board JJJ–B–106; 1930. Dry Beans. Includes specifications for shipping sacks for 100 pounds of beans. For double burlap sacks, requirements on weight of burlap, for combination burlap or Osnaburg and cotton double sacks, requirements on weight of burlap or Osnaburg fabric in outer sack and on weight of cotton in inner sack.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 36A. Triplex Bags. For 2 types, one of Osnaburg cloth lined with and cemented to 2 sheets of kraft paper, and one of 2 kraft paper bags inside of Osnaburg cloth bag, mandatory requirements on grade and weight of paper, weight of cloth, construction of bag, tensile strength, drop test, dangerous materials for which authorized.

References.—Jute burlap. *See also* 322.1. Tolerances on fabrics, methods of testing, standard sizes and weights. *See also* 303.0, 300.4, 300.6. Stitches and stitching. *See also* 300.7.

957.2 PAPER BAGS AND PAPER LINING FOR BOXES

Consolidated Classification Committee. Consolidated Freight Classification No. 6 and Supplement No. 6; 1930. Rule 40, section 10. Bags. For paper bags used as outer shipping containers, for 6 standard bag sizes, for single wall, double wall, and multiple wall bags, and for rope stock and kraft bags, requirements on capacity, weight and Cady or Mullen test strength for individual sheets, percentage of manila rope fiber in rope stock paper.

Kraft Institute. Standards for Odd Bags; 1931. Glassine bags, flat and square types, for peanuts, collars, sandwiches, pies, cakes, popcorn, cookies, load bread, and of various weight capacities up to 2 pounds, standard dimensions, weight of paper, quantity per bale, and bale weight.

Kraft Institute. Standards for Odd Bags; 1931. Paper banana bags, garment bags, poultry sacks, standard sacks up to ¼ barrel, nail bags, sugar bags, millinery bags, notion bags, and candy bags, standard dimensions for several sizes of each type, required weight of paper, packing quantity per bale, and width of roll.

U. S. Gov., Dept. of Commerce, Bureau of Standards R42; 1925. Paper Grocers' Bags. Simplified practice recommended and accepted by industry establishing a limited list of standard capacities by volume for grocers' bags, with colors, quality, and strength in accordance with selected brands of Union Bag and Paper Corp. and Continental Paper and Bag Mills Corp.

U. S. Gov., Dept. of Commerce. Bureau of Standards R 129–31; 1931. Notion and Millinery Paper Bags. Simplified practice recommended and accepted by industry establishing a limited list of standard sizes of notion and millinery paper bags used by department and specialty stores, width and length given for each bag size.

U. S. Gov., Dept. of Commerce. Bureau of Standards T187; 1921. A Study of Test Methods for the Purpose of Developing Standard Specifications for Paper Bags for Cement and Lime. Includes requirements on bursting and tensile strength, on percentage of manila and jute fiber, on allowable ash and required rosin, on wet tensile strength, folding endurance, and resiliency strength, methods of test.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2D. Duplex Paper Bags. As inside containers for shipment of dangerous materials, mandatory requirements on use of No. 1 kraft or rope paper, strength and weight of paper, construction of pasted bottom and of sewed bottom types, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2J. Paper Bag Lining. As inside container for shipment of dangerous materials, mandatory requirements on grade and construction of paper using asphaltum cement, test for imperviousness to water, crimping, size, method of closure, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2K. Paper Bag Lining. As inside container for shipment of dangerous materials, mandatory requirements on use of No. 1 kraft paper, weight, crimping, closure, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2L. Paraffined Paper Lining. For inside lining of boxes used in shipment of dangerous materials, mandatory requirements on tensile strength, imperviousness to water and nitroglycerine, unstaining properties, melting point of paraffin, methods of test, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2M. Waterproofed Paper Lining. For inside lining of boxes used in shipment of dangerous materials, mandatory requirements on general qualities and construction without joints or openings, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 36A. Triplex Bags. For 2 types, one of Osnaburg cloth lined with and cemented to 2 sheets of kraft paper, and 1 type made of 2 kraft paper bags inside of Osnaburg cloth bag, mandatory requirements on grade and weight of paper, weight of cloth, construction of bag, tensile strength, drop test, dangerous materials for which authorized.

References.—Bag and wrapping paper. *See also* 477. Methods of testing paper. *See also* 470.3.

957.3 CARRYING BAGS

957.4 RUBBER BAGS

References.—Rubber bags and bottles. *See* 204.2.

958. CHESTS, TRUNKS, AND SUITCASES

958.1 ENGINEERS' CHESTS AND KITS

958.2 TOOL CHESTS AND KITS

958.3 TRUNKS AND SUITCASES

National Luggage Dealers Assn. Suggestions for Standardization and Simplification in the Luggage Business. Undated. Dimensions of suggested standard sizes for wardrobe trunks, dress trunks, steamer trunks, three-quarter trunks, women's suit cases, tourists' cases, and round edge hat boxes.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 32C. Baggage Trunk. For shipment of motion picture films, mandatory requirements on construction of compartments for films and metal lining of trunk, lining of compartments with fiber, materials that may be packed.

958.9 MISCELLANEOUS CHESTS AND KITS

References.—Medicine chests. *See* 915.43.

959. MISCELLANEOUS CONTAINERS

959.1 CANS

American Railway Assn. Freight Container Bureau. Bulletin No. 1; 1926. Cans for Liquids, Semiliquids and Pastes. Recommended weight of tin plate, illustrated usual construction of seams and likely defects, recommended leakage and drop tests.

American Railway Assn. Freight Container Bureau. Tentative Specifications. Circular No. 9; 1923. Cans for Eggs (Shelled and Frozen) and Outside Containers. Requirements for weight of tin, construction of seams and cover, strength of paper wrapper and twine, wrapping with paper and with burlap, for the cans. Quality of wood, construction and nailing of crates.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Lamp Filler and One Pint Signal Oil Can. Three and Five Pint Valve Oil Cans. Dimensions and design of recommended standard cans, cylindrical shapes, with spout, handle, and bail, of tin or cold rolled steel.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. One Pound Emery Can. Dimensions, metal gage, and design of recommended standard can of tin or cold rolled steel.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Soil Can. Garbage Can. Refuse Can. Dimensions, metal gage, and design of recommended standard of each type of can of galvanized iron, 22 gallon capacities except for soil can which is 10 gallon.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Sprinkling and Cooling Can. Dimensions, metal gage, and design of two sizes of sprinkling cans of tin or cold rolled steel.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Squirt Oil Cans. Dimensions and design for recommended standard conical type, hemispherical type, and long spout engine oil can, of steel or tin.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Three Gallon, Five Gallon, and Ten Gallon Oil Cans. Dimensions, metal thickness, and design of recommended standard can of each size, cylindrical shape, with lop sided conical top, with bail, of galvanized iron.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Two Gallon Journal Oil Can. Dimensions, metal gage, and design of recommended standard can with spout and bail handle, of galvanized iron.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Two Quart, One Gallon, and Two Gallon Oil Cans. Dimensions, metal thickness, and design of recommended standard cans of cylindrical shape, with spout, conical top, handle, and bail of tin or cold rolled steel.

Consolidated Classification Committee. Consolidated Freight Classification No. 6; 1930. Rule 40, section 8. Jacketed Metal Cans. Requirements on thickness of sides and ends of wooden jackets, construction, thickness and strength of fiberboard or pulpboard jackets, number of hoop reinforcements, soldering or welding of can seams.

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 482; 1930. Sirup, Ratings. Metal Cans for packing of sirup, requirements for metal jacket frame, thickness and Mullen test of solid fiberboard facing.

Institute of American Meat Packers. Packinghouse Supplies, Packs and Equipment; 1928. Lard Cans. For flaring side pails with covers, straight side cans and drums up to 120 pounds capacity, and square cans for export trade, requirements on dimensions, design, weight of tin plate, gage of wire handles, details of side seams.

International Assn. of Ice Cream Mfrs. Special Bulletin No. 12; 1929. Standard Ice Cream Cans. Dimensions of cans and type of cover for high and low type 5 and 2½ gallon cans and for high type 1-gallon can.

International Assn. of Milk Dealers. Standard Neck Diameters for Milk Cans. Undated. For 5-gallon size, standard diameters, tolerances, and taper for 6⅛ and 7¼ inch neck sizes.

National Canners Assn. Bulletin 47; 1928. Canned Food Boxes. Includes a list of standard can sizes, with usual dimensions for diameter and height, for No. 1, No. 1 tall, salmon 1 pound, milk sweetened, milk tall evaporated, No. 2, No. 2½, No. 3, and No. 10, packing arrangement for cans in shipping boxes.

Underwriters' Laboratories (Inc.). Design and Construction of Safety Cans; 1930. Covers cans for storage and handling of flammable liquids inside buildings up to 10 gallons capacity, requirements on stability of filled can, provision of valves on openings, relief valves, bottom construction, thickness of metal in can, construction of joints, handles, spouts, valves, leakage and pressure tests of can, endurance test of valves.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2A and 2B. Metal Cans. Inside containers for shipment of dangerous materials, mandatory requirements on capacity limits, thickness of metal, air-tightness and leak-proofness, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2G. Fiber Cans and Boxes. As inside containers for shipment of dangerous materials, mandatory requirements on construction, thickness of materials, attachment of tops and bottoms, strength of materials, for capacities of 3 to 5 pounds, dangerous materials for which authorized.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2N. Metal Cans. As inside containers for shipment of dangerous materials, mandatory requirements on limiting dimensions and capacity, thickness of tin plate used in body and heads, construction of seams, interior pressure test, dangerous materials for which authorized.

References.—Iron and steel sheets. *See* 604.2. Methods of testing and general requirements for metals. *See also* 600.1. Zinc and tin coatings and methods of testing. *See also* 600.3. Fiberboard, methods of testing fiberboard. *See also* 472.93. 470.3.

959.2 TANK CARS

References.—Tank cars, automobile truck tanks. *See* 726.1, 722.1.

959.3 CASKETS AND CASKET BOXES

American Concrete Institute. Proceedings of A. C. I., Vol. 27, p. 1251 (June, 1931, Journal of A. C. I.). Proposed Specifications for Concrete Burial Vaults. For reinforced vaults composed of a base and cover, cement and reinforcing according to specifications of Am. Soc. for Testing Materials, requirements on general quality and screen grading of fine and coarse aggregates, and on placing of reinforcement, suggested requirements on slump test, strength of concrete, absorption test of concrete, and strength and hydrostatic tests of vault.

959.4 REFRIGERATORS

U. S. Gov., Dept. of Commerce. Bureau of Standards R96–28; 1928. Ice Cake Sizes. Simplified practice recommended and accepted by industry limiting the weights and dimensions of ice cakes for domestic refrigerators to the ones listed in the publication.

U. S. Gov., Dept. of Commerce. Bureau of Standards R109–29; 1929. Refrigerator Ice Compartments. Simplified practice recommended and accepted by industry, covers standard capacities and dimensions of ice compartments of domestic refrigerators for side icer and top icer types.

959.5 SPECIAL CONTAINERS

U. S. Gov., Federal Specifications Board. 68a; 1925. Sterilizers, Dressing Containers, etc. For drum shaped dressing containers of sheet copper, requirements on construction, thickness of metal, capacity of electric heater, construction of straight type container stand for 1 to 4 containers, finish.

959.6 WRAPPINGS AND COVERINGS

Consolidated Classification Committee. Consolidated Freight Classification No. 6, p. 57 to 548; 1930. Wrappings and Coverings. Above pages include many articles for which wrappings and coverings are specified in order to obtain the freight rate given in tables, requirements usually include minimum thickness, Mullen strength test, number of layers of wrappings, tieing, etc., for paper and for fiberboard wrappings and coverings.

References.—Lined boxboard, corrugated boxboard, fiberboard. *See also* 472.16, 472.23, 472.93. Wrapping paper. *See also* 477. Gummed paper. *See also* 479.2. Methods of testing fiberboard and paper. *See also* 470.3.

959.7 DUMP AND STORAGE BINS AND HOPPERS

References.—Dump, blending, and storage bins for bakeries. *See* 786.

959.8 LIQUID AND DRY MEASURES

References.—Liquid measures, dry measures. *See* 919.1.

959.9 CONTAINERS NOT ELSEWHERE CLASSIFIED

National Assn. of Wooden Box Manufacturers. Pacific Coast Division, Tariff No. 1. 1928. Box and Crate Specifications. Trays. For 12 varieties of raisin and fruit drying trays, requirements on number and dimensions of component pieces.

U. S. Gov., Dept. of Commerce. Bureau of Standards R95–30; 1930. Skid Platforms. Simplified practice recommended and accepted by industry for skid platforms used in shipment of freight establishing 2 standard clear heights of platforms, a minimum distance between runners, and 2 standard over-all dimensions of platforms.

U. S. Gov., Interstate Commerce Commission. Regulations for Transportation by Rail of Dangerous Articles; 1930. Container Spec. 2F. Metal Containers and Liners. For inside containers and metal box lining, mandatory requirements on thickness of metal and leakproofness, dangerous articles for which authorized.

References.—Box shook and crating. *See also* 421.4. Nails. *See also* 608.1. Grading rules for box lumber. *See* 413.9. Sterilizers. *See* 915.32. Soap kettles. *See* 787. Envelopes. *See* 494.

970–979 FIRE EXTINGUISHING APPARATUS AND SUPPLIES

970. GENERAL ITEMS

American Electric Railway Engr. Assn. Misc. methods and practices. B204–11; 1911. Fire protection of car houses and terminals including open yards. Recommends automatic sprinklers, universal nozzles, standard fire hose and nozzle, size of pumps, etc.

American Mining Congress. National Fire Protection Assn. Approved by American Standards Assn. as M17–1930. Fire Fighting Equipment in Metal Mines. Recommendations on type and size of hose and water supply systems for surface and for underground fire fighting equipment; equipment of extinguishers, fire pails, sprinkling systems, oxygen breathing apparatus; recommendations on ventilation, handling explosives, signals, etc.

National Board of Fire Underwriters. First Aid Fire Appliances; 1931. List of fire appliances for 3 fire classifications, method of operation, suitability, unit of installation, area per unit, and maintenance of fire pails, foam pails, soda-acid, foam, pump tank, calcium chloride, and special tetrachloride extinguishers, sand pails, soda and sawdust.

National Board of Fire Underwriters. Outside Protection; 1931. Private Underground Piping Systems Supplying Water for Fire Extinguishment. Types of valves and locations, type, number, location and setting of hydrants, standard monitor nozzles and applications, size and weight of pipe and layout of piping system, rules for laying pipe.

National Board of Fire Underwriters. Standpipe and Hose Systems; 1928. For installation inside of buildings, minimum sizes of standpipes for various heights of building and size of hose, number and location of standpipes, location of hose stations, type of hose, hose racks, hose valves and nozzles, character and amount of water supply, connections and fittings, pressure and delivery test requirements.

National Board of Fire Underwriters. Suggested Fire Prevention Ordinance; 1930. For cities and towns recommended regulations for fire prevention and protection in connection with hazardous materials and processes, such as explosives, pyrotechnics and small-arms ammunition, motion-picture film, pyroxylin plastic, photographic and X-ray film, calcium carbide and acetylene, compressed gas systems, flammable liquids, application of flammable liquids, dry cleaning and dyeing, prevention of dust explosions, hazardous chemicals, combustible fibers, refrigeration, matches, garages, fire exits, fire extinguishing equipment, gas appliances and connections, penalties for violation.

National Board of Fire Underwriters. Suggested Ordinance for the Organization and Regulation of Volunteer Fire Departments; 1930.

National Fire Protection Assn. Rural Fire Departments; 1929. A guide to the purchase of efficient fire-fighting apparatus and outlining certain essentials of department organization as relates to the operation and maintenance of the equipment. Covers location and general features of building for housing equipment, specifications for combination pumping engine and hose cart and of motor chemical car.

References.—Fire cars for railroad yards. *See* 726.1.

971. MOTOR FIRE APPARATUS

References.—Automobile fire apparatus. *See* 722.2. Stationary fire pumps. *See* 755.1. Fire-fighting equipment for rural fire departments. *See* 970.

972. HAND-DRAWN FIRE APPARATUS

973. CHEMICAL FIRE EXTINGUISHERS

973.1 CHEMICAL ENGINES

National Fire Protection Assn. Rural Fire Departments, Equipment and Organization; 1929. Includes motor chemical car, requirements on tank capacity, tinning of copper tanks, lead lining or galvanizing of steel tanks, hydrostatic pressure test of tank.

References.—Methods of testing tin, lead, and zinc coatings. *See* 600.3.

973.2 HAND CHEMICAL FIRE EXTINGUISHERS

Underwriters' Laboratories. Hand Fire Extinguishers, One Quart Size, Pump Type; 1919. Made of brass or lead or other noncorrosive metal, strength of container, range of stream, time for discharge, composition, volatility, and specific gravity of liquid, jar test, drop test, and fire extinguishment test.

Underwriters' Laboratories. 2½, 1½, and 1¼ Gallon Foam Extinguishers; 1929. Capacity limits, design requirements for copper shell, brass cap, handles, containers, stopple, hose, etc., composition of chemical charge, durability and adhesion of foam, stability of compounds, generated pressure limits, distance and quantity of foam thrown, standard fire extinguishment test requirements.

Underwriters' Laboratories. 2½ Gallon Loose Stopple Soda Acid Extinguisher. 1¼ and 1½ Gal. Soda Acid Extinguisher; 1929. Capacity limits, metal thickness and strength of copper shell, design requirements for shell, cap, handles, outlet, cage, bottle, hose, nozzle, etc., protective coating, composition of chemical charge, generated pressure, duration of stream requirements.

U. S. Gov., Federal Specifications Board O–F–351; 1931. Hand Chemical Fire Extinguishers, Carbon Tetrachloride Type. For type using pump for expelling liquid, parts of brass, lead, or corrosion resistant materials, requirements on resistance to vibration, drop test, minimum capacity, operating features, range and rate of discharge, liquid according to F. S. B. Spec. O–F–380.

U. S. Gov. Federal Specifications Board O–F–355; 1931. Hand Chemical Fire Extinguisher, Soda and Acid Type. For 2½-gallon size, using bicarbonate of soda and sulphuric acid, requirements on coating of interior with tin and lead alloy, materials and construction of copper shell, brass collar, cap, bottle cage, etc., test on range and time of discharge, hydrostatic pressure test.

References.—Protective coatings and methods of testing. *See also* 600.3. Chemical charges. *See also* 973.3. Hose for extinguishers. *See* 202.21.

973.3 CHEMICAL CHARGES FOR FIRE EXTINGUISHERS

References.—Chemical charges for hand fire extinguishers. *See* 973.2. Carbon tetrachloride. *See also* 839.7. Sulphuric acid. *See also* 821.7. Methods of testing and general requirements for metals. *See also* 600.1.

973.4 CARBON DIOXIDE FIRE-EXTINGUISHING SYSTEMS

National Board of Fire Underwriters. Carbon Dioxide Fire Extinguishing Systems; 1929. Requirements on purity of gas, mounting of gas cylinders, automatic or manual gas relief devices for cylinders, strength of piping, size of pipe and of discharge orifices, thermostatic and manual release devices, alarms, discharge outlets, required gas supply for various spaces and areas protected.

973.5 FOAM EXTINGUISHER SYSTEMS

National Board of Fire Underwriters. Foam Extinguisher Systems; 1931. General requirements for foam producing materials, capacity of system, means of supply, design and location of pipe lines, valves, hydrants, release devices, etc.

974. FIRE HOSE AND FITTINGS

974.0 GENERAL ITEMS

American Society of Mechanical Engineers, joint sponsor with National Board of Fire Underwriters and the American Water Works Assn. under the procedure of the American Standards Assn. B 26–1925. Fire Hose Coupling Screw Thread. Covers the threaded part of fire-hose couplings, hydrant outlets, and stand pipe connections. Tables of limiting dimensions of external and internal threads and of plug and ring gages for field inspection for 2½, 3, 3½, and 4½ inch hose sizes. Separate publications on Production of National Standard Fire-Hose Coupling Screw Thread, for the information of manufacturers, and Field Inspection of National Standard Fire-Hose Coupling Screw Thread, for the information of fire chiefs.

Associated Factory Mutual Fire Insurance Companies. Committee of Manufacturers on Standardization of Fittings and Valves. National Board of Fire Underwriters. National Fire Protection Assn. Standard Threads for Hose Couplings; 1922. Standard dimensions of threads for sizes from ½ to 2 inches.

Associated Factory Mutual Fire Insurance Companies. Standardization of 2½-inch Hose Threads for Fire Hose, Couplings, Hydrants and Valves; 1926. Dimensions of standard thread for hose couplings, for coupling swivels and hydrant caps, and for hydrant nipples.

U. S. Gov., National Screw Thread Commission Publ. M89 of Bureau of Standards; 1929. Report of National Screw Thread Commission; 1928. American National hose coupling and fire-hose coupling threads. Mandatory for material purchased and used by War and Navy Depts. Requirements on thread form, dimensions and tolerances, for coupling thread and for nipple thread of hoze sizes ¾ to 4½ inches. Not in conflict with dimensions recommended by Nat'l Fire Protection Assn.

974.1 FIRE HOSE

References.—Fire hose. *See* 202.41.

974.2 FIRE-HOSE FITTINGS

American Railway Assn. Mechanical Div. Recommended Practice; 1927. Fire Hose. Includes fire-hose couplings, requirements on chemical composition and weight.

Associated Factory Mutual Fire Insurance Companies. Fire Hose, Couplings, and Playpipes; 1930. For couplings and playpipes, requirements on construction, chemical composition of material, dimensions and thread. Couplings of brass of 2½ and 1¼ inch sizes.

National Board of Fire Underwriters. Fire Department Hose Connections for Sprinkler and Standpipe Systems; 1924. Connection coupling of bronze or cast iron, thread, dimensions, and construction, construction of check valve clappers, and seat rings.

References.—Standard threads for couplings, hydrants, and valves. *See* 974.0. Methods of testing and general requirements for metals. *See also* 600.1, 644.11. Fire hydrants. *See* 607.6.

974.3 FIRE-HOSE RACKS

American Marine Standards Committee. H No. 16–1926. Fire Hose Racks for Ships. Metal Rack for 2½-inch Fire Hose. Standard dimensions and design of wrought steel rack for 50 feet of hose, structural requirements, for stowage of coiled rubber lined hose.

American Marine Standards Committee. H No. 18–1927. Fire Hose Racks for Ships. Metal Rack, Saddle Type, For 2½-inch Fire Hose. Standard dimensions, design, and structural requirements for malleable iron or cast saddle type rack for stowage of unlined hose laid in successive layers over the saddle.

American Marine Standards Committee. H No. 19–1927. Fire Hose Racks for Ships. Wooden Rack for Fire Hose. For sheltered locations, standard dimensions, design, and structural requirements for wooden rack for 50 feet of unlined hose or for coiled jacketed hose, made of ash or equal.

U. S. Gov., Federal Specifications Board. 448; 1926. Plumbing Fixtures. (For Land Use.) Fire-Hose Rack. Iron or steel rack for hanging hose in vertical loops on nondetachable pins or supports as illustrated.

975. FIRE PUMPS AND FITTINGS

References.—Fire pumps and accessories. See 755.0, 755.1, 755.2. Automobile fire trucks. *See* 722.2.

976. AUTOMATIC SPRINKLER SYSTEMS

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Railway Buildings, sec. 27. Sprinkler System. General installation requirements, permissible types of sprinkler heads, system to conform to regulations of National Board of Fire Underwriters.

Associated Factory Mutual Fire Insurance Companies. Care and Maintenance of Fire Protective Equipment; 1923. Includes standard method of sealing sprinkler valves by leather strap to prevent closure, also precautions to be taken when water supply is to be shut off from a fire protective system.

Associated Factory Mutual Fire Insurance Companies. Rules for Installing Dry Pipe Sprinkler Equipment; 1930. Maximum permissible size of system on one valve, installation rules, rules on location of dry pipe valves, construction of valve rooms, by-pass connections, capacity and equipment of air compressor, electrical and mechanical alarms, directions for setting and testing dry pipe valve, care and inspection of system.

-Associated Factory Mutual Fire Insurance Companies. Rules for Installing Sprinkler Equipments, Automatic and Open Systems; 1930. General information, rules for installing automatic and for installing open sprinkler equipments, suggestions regarding water supplies and general protection.

National Board of Fire Underwiters. Sprinkler Equipments; 1931. Location and spacing of automatic sprinklers, pipe sizes, protection against frost, types and required use of valves and fittings, drips and drainage, test pipes, gages, alarms, dry pipe valve and air pressure for dry pipe systems, water supply, sizes of pumps, tanks and connections, pressure test requirements for system.

References.—Wrought-iron pipe and fittings, steel pipe and fittings. *See* 607.3, 607.4. Valves. *See* 607.6. Cast-iron pipe and long-turn sprinkler fittings. *See* 607.14.

977. HYDRANTS AND PARTS

References.—Fire hydrants. *See* 607.6.

978. FIRE BARRELS AND PAILS

References.—Fiber fire bucket. *See* 951.63. Shipping barrels and pails. *See* 951.1, 951.6.

979. MISCELLANEOUS FIRE-EXTINGUISHING APPARATUS

979.1 FIRE LADDERS

References.—Ladders for commercial use. *Sec* 429.4.

979.2 FIRE LANTERNS

979.3 FIRE ALARMS

References.—Fire alarm systems. *See* 718.30, 718.32.

BRUSHES AND BROOMS

981. BROOMS

981.0 GENERAL ITEMS

U. S. Gov., Dept. of Commerce, Bureau of Standards R88–29; 1929. Floor Sweeps. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes of floor sweeps, 6 sizes for length of block.

981.1 CORN BROOMS

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Hide Broom of corn and rattan, Warehouse Broom of corn, weight requirements, illustrated.

U. S. Gov., Federal Specifications Board 333a; 1927. Corn Brooms. For 3 sizes, requirements on general quality of broom corn and of handle, construction details and stitching, dimensions, size of binding wire, number and spacing of ties, and weight of broom.

U. S. Gov., Federal Specifications Board 511; 1927. Metal Case Brooms. For 3 sizes, requirements on general quality of broom corn, kind of wood, size, and length of handle, width, metal gage, and attachment of iron or steel head, length of broom body, nailing and tieing requirements, weights.

References.—Grades of broom corn. *See* 294. Whisk brooms. *See* 981.5.

981.2 RATTAN BROOMS

U. S. Gov., Federal Specifications Board 204; 1924. Push Rattan Broom. For one type with 16-inch block, requirements on design, dimensions, and permissible woods for block, on size, length, and weight of ⅛-inch round rattan bristles, number and size of bristle holes, dimensions of handle.

U. S. Gov., Federal Specifications Board 205; 1924. Upright Rattan Broom. For broom made of ⅛-inch size rattan bound to a handle, requirements on construction, length, weight, and number of strands in broom proper, dimensions and length of handle.

981.3 WIRE BROOMS

U. S. Gov., Federal Specifications Board 207; 1924. Wire Push Broom. For broom made of flat steel wire bristles in 16 inch hardwood block, requirements on size of wire, dimensions of block, cover and handle, number, size, and arrangement of bristle holes, number and length of wire strands per hole.

981.4 HAIR FLOOR SWEEPS

Institute of American Meat Packers. Packinghouse Supplies, Packs and Equipment; 1928. Push Brooms. No. 16 broom of horsehair, requirements on size of block, length of trim, number of rows.

U. S. Gov., Federal Specifications Board H–B–651; 1930. Hair Floor Sweeping Brushes. For 14, 18, and 24 inch sizes, requirements on material and general quality of bristle stock, on material, finish, and boring of wooden block, on size, threading, and finish of wooden handle, number of holes in block, minimum weight and length of hair, workmanship and quality to conform to standard sample.

References.—Standard sizes. *See* 981.0.

981.5 HOUSEHOLD AND WHISK BROOMS

U. S. Gov., Federal Specifications Board 332; 1925. Whisk Brooms. For 8 and 10 inch sizes, requirements on construction, stitching, dimensions, winding of handle, and weight.

References.—Grades of broom corn. *See* 294. Corn brooms, hair floor sweeps. *See* 981.1, 981.4.

981.6 BROOMS FOR INDUSTRIAL USE

981.61 Scrubbing Brooms

U. S. Gov., Federal Specifications Board 206; 1924. Scrubbing Broom. For broom made of African bass fagoted about a handle and bound with brass wire, requirements on dimensions and kinds of wood of handle, construction of broom, size of brass binding wire.

References.—Deck scrubbing brush or broom. *See* 982.3.

981.62 Pavement and Street Sweeping Brooms

U. S. Gov., Federal Specifications Board 201; 1924. Sidewalk Brush. For 18, 24, and 30 inch hardwood block, requirements on percentage of tampico fiber and of steel brush wire bristles, dimensions of block and handle, number and dimensions of bristle holes, attachment and length of bristles.

References.—Standard sizes of floor sweeps. *See* 981.0. Corn brooms, rattan brooms. *See* 981.1, 981.2. Push brooms. *See* 981.63.

981.63 Push Brooms

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Push Brooms. No. 261 of fiber, No. 16 of horsehair, requirements on size of block, length of trim, number of rows.

U. S. Gov., Federal Specifications Board 398; 1926. Fiber Garage Brush. For 3 sizes, requirements on proportions of bassine and tampico fiber, trim and setting of fiber, dimensions, shape, and finish of hardwood block and handle, number of rows and holes, size of holes, weight of fiber.

References.—Hair floor sweep. *See* 981.4. Wire push broom, rattan push broom. *See* 981.3, 981.2. Standard sizes of floor sweeps. *See* 981.0.

981.64 Factory and Warehouse Brooms

References.—Corn warehouse brooms. *See* 981.1. Rattan brooms, wire brooms, hair floor sweeps, scrubbing brooms, push brooms. *See* 981.2, 981.3, 981.4, 981.61, 981.63.

982. BRUSHES

982.1 TOILET BRUSHES

U. S. Gov., Federal Specifications Board 198; 1924. Military Hair Brush. For solid back type and for aluminum face type, requirements on general quality of hardwood, on thickness of aluminum, texture and length of Chungking bristles, dimensions of block or back, number and size of bristle holes, setting of bristles.

U. S. Gov., Federal Specifications Board 200; 1924. Shaving Brush. Requirements on dimensions of hardwood handle and pyroxylin plastic ferrule, on length and setting of French bristles.

U. S. Gov., Federal Specifications Board 202; 1924. Tooth Brush. For tufted end type and sloping type, bristles to be equal to butt cut 3¼-inch white China bristles, handle of pyroxylin plastic, required number and size of bristle holes.

982.2 PAINT BRUSHES

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Stencil Brush. Of Chinese bristle, requirements on length of bristle, diameter, vulcanized in rubber, illustrated.

U. S. Gov., Dept. of Commerce, Bureau of Standards R43–28; 1928. Paint and Varnish Brushes. Simplified practice recommended and accepted by industry establishing a limited list of standard stock sizes of plasterers' and skimming brushes, smoothing brushes, leather bound wall and stucco brushes, bristle artist brushes, flat varnish, wall, calcimine, whitewash, and stencil, brushes, oval and flat oval varnish brushes, round painters' brushes, and sash brushes.

U. S. Gov., Dept. of Commerce, Bureau of Standards R121–31; 1931. Block Sizes for Calcimine Brushes. For calcimine or kalsomine brushes, simplified practice recommended and accepted by industry establishing a limited list of standard widths and thicknesses for blocks for Dutch, semi-Dutch, and baby Dutch brushes.

U. S. Gov., Federal Specifications Board 518a; 1929. Knotted Style Roof Brushes, Three Knots. Requirements on type of Russian bristle casing and Tampico fiber middle, construction and setting of knots, boring of block, dimensions of inside of knot, depth of wire ferrule and bristle hold, weight and length of bristle, etc., to equal standard sample in workmanship and material.

U. S. Gov., Federal Specifications Board H–B–141; 1930. Calcimine Brushes. Requirements on finish and kinds of wood in handle, thickness and construction of iron ferrule, width and thickness of brush, weight and length of bristle, setting of bristle, types and percentages of Russian and Hankow bristles, to equal standard sample in workmanship and materials.

U. S. Gov., Federal Specifications Board H–B–181; 1930. Long Paddle Dauber Brushes. Brush for daubing asphalt and tar, etc., requirements on dimensions and paddle shape of hardwood block, number, size and slant of bristle holes, length, weight, and attachment of tampico fiber bristle stock, finish.

U. S. Gov., Federal Specifications Board H–B–241; 1930. Fitch Flat Brush. For 6 sizes, requirements on general quality and trim of Chinese bristle, finish and shape of handle, dimensions, shape, and method of application of tin ferrule, weight, length, setting, and hold of bristle, to equal standard sample in dressing and material.

U. S. Gov., Federal Specifications Board H–B–251; 1930. Badger Hair Flowing Brushes. For 4 sizes, 1 to 2½ inches, requirements on general quality, types and percentages of mix of hair, finish of handle, depth and construction of tin ferrule, setting, weight, length, and hold of hair, width and thickness of brush, to equal standard sample in quality of hair and construction.

U. S. Gov., Federal Specifications Board H–B–256; 1930. Skunk Hair Flowing Brushes. For 5 sizes, 1 to 3 inches, requirements on general quality of hair, finish of handle, depth and construction of tin ferrule, setting, weight, length, and hold of hair, width and thickness of brush, to equal standard sample in quality of hair and construction.

U. S. Gov., Federal Specifications Board H–B–261; 1930. Squirrel Tail Hair Flowing Brush. For 4 sizes, 1 to 2½ inches, requirements on general quality and type of hair, finish of handle, depth and construction of tin ferrule, setting, weight, length, and hold of hair, width and thickness of brush, to equal standard sample in quality of hair and construction.

U. S. Gov., Federal Specifications Board H–B–351; 1930. Flat Lacquering Brushes. For 3 sizes, requirements on general quality and type of squirrel tail hair, size, shape, and finish of handle, material, shape, dimensions, and construction of ferrule, setting and length of hair, equal in workmanship and material to standard sample.

U. S. Gov., Federal Specifications Board H–B–371; 1930. Marking Brushes. For 3 sizes, requirements on general quality and dressing of Chinese bristle, shape and finish of handle, dimensions, shape and construction of tin ferrule, setting and length of bristles, equal in workmanship and material to standard sample.

U. S. Gov., Federal Specifications Board H–B–391; 1930. Mottling Brushes. For 5 sizes, requirements on general quality, type, and dressing of squirrel tail hair, on style and finish of hard wood handle, dimensions and attachment of tin ferrule, type and method of setting of hair, length and minimum weight of hair, equal in workmanship and material to standard sample.

U. S. Gov., Federal Specifications Board H–B–421; 1930. Flat Metal Bound Paint Brushes (High Grade). For 2 sizes, requirements on general quality and proportion of stiff material in Chinese or Russian bristles, kind of wood and finish of handle, depth, metal gage, and construction of tin ferrule, setting, weight, length, and hold of bristles, width and thickness of brushes, to equal standard sample in workmanship and materials.

U. S. Gov., Federal Specifications Board H–B–431; 1930. Flat Metal Bound Paint Brushes (Medium Grade). For 4 sizes, 3 to 5 inches, requirements on general quality and dressing of Chinese or Russian bristle, kind of wood and finish of handle, depth, metal gage, and construction of tin ferrule, setting, weight, length, and hold of bristles, width and thickness of brush, equal to standard sample in quality of bristles and construction.

U. S. Gov., Federal Specifications Board H–B–451; 1930. Radiator Bronzing Brushes. For 3 sizes, requirements on general quality of goat hair, style and finish of handle, depth and construction of tin ferrule, setting of hair, width and thickness of brush, weight and length of hair, to equal standard sample in workmanship and quality of hair.

U. S. Gov., Federal Specifications Board H–B–491; 1930. Oval Sash-Tool Brushes. For 5 sizes, requirements on general quality and dressing of Chinese bristle, shape and finish of hardwood handle, dimensions and attachment of steel ferrule, depth and type of setting of bristle, length and weight of bristle, brush to equal standard sample in material and workmanship.

U. S. Gov., Federal Specifications Board H–B–621; 1930. Stencil Brushes (Flag Ends Cut). For 2 sizes, requirements on general quality of Chinese bristles, type and finish of handle, setting of bristles, diameter and depth of steel ferrule, weight and length of bristle, hold of bristle, to equal standard sample in dressing, workmanship, and material.

U. S. Gov., Federal Specifications Board H–B–626; 1930. Stencil Brushes (Flag Ends Preserved). For 2 sizes, requirements on general quality of Chinese bristle, finish of handle, setting of bristle, diameter and length of steel ferrule, diameter of steel plug, weight and length of bristle, bristle hold, to equal standard sample in workmanship and material.

U. S. Gov., Federal Specifications Board H–B–636; 1930. Wall Stippling Brushes. Requirements on general quality, percentage mixture, and dressing of Chinese and Russian bristle, size and construction of block, setting of bristle, size and number of holes, number of rows, length and weight of bristle, equal in workmanship and materials to standard sample.

U. S. Gov., Federal Specifications Board H–B–701; 1930. Flat Varnish Brushes (Double X Thickness). For 5 sizes, requirements on general quality and dressing of Chinese bristle, material and finish of wood handle, thickness and construction of nickeled tin ferrules, setting of bristles, width and thickness of brush, depth of ferrule and hold of bristle, length and weight of bristle, to equal standard sample in workmanship, material.

U. S. Gov., Federal Specifications Board H–B–706; 1930. Flat Varnish Brushes (Triple X Thickness). For 4 sizes with requirements of the types listed under F. S. B. Spec. H–B–701 for flat varnish brushes of double X thickness.

U. S. Gov., Federal Specifications Board H–B–731; 1930. Whitewash Brushes. For 7-inch size, requirements on general quality of Chinese or Russian bristle, thickness and attachment of tin ferrule, type and finish of extension style block, setting of bristles, width and thickness of brush, weight and length of bristles, depth of band and bristle hold, to conform to standard sample for dressing, workmanship and materials.

References.—Glue brushes. *See* 982.9. Painters' dust brushes. *See* 982.3.

982.3 CLEANING BRUSHES

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Fiber Brushes. Requirements on size of block, palmetto or bassine fiber, bristle length, number of rows, number of holes, includes fiber fountain brush for washing beef, etc., fountain sheepnose brush, washing brush for beef necks, and washing brush for beef backs.

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928. Wire Brushes. Requirements on size of block, flat or round wire, bristle length, ends per hole, number and rows of holes, includes butchers' block brush, metal cleaning brush for structural steel and castings, flat wire fountain brush for brushing out hogs necks and scrubbing tables, flat back wire brush for steel and iron equipment, and shoe handle scratch brush for cleaning dies and files, illustrated.

U. S. Gov., Federal Specifications Board 199; 1924. Radiator Dusting Brush. For one grade and size of brush with horse-tail hair bristles along one edge of flat hardwood block, requirements on dimensions of block, size and number of bristle holes and amount of hair bristles.

U. S. Gov., Federal Specifications Board 201; 1924. Sidewalk Brush. For 18, 24, and 30 inch hardwood block, requirements on percentage of tampico fiber and of steel brush wire bristles, dimensions of block and handle, number and dimensions of bristle holes, attachment and length of bristles.

U. S. Gov., Federal Specifications Board 203; 1924. Window Brush. Requirements on general quality, and weight of horse-tail hair bristles, dimensions of round block, size and number of bristle holes, dimensions of handle.

U. S. Gov., Federal Specifications Board 208a; 1925. Counter Duster. For hand brush with handle and block of one piece of hardwood, requirements on length and weight of black bristles, dimensions of block and shaped handle, number and size of bristle holes, attachment of bristles.

U. S. Gov., Federal Specifications Board 398; 1926. Fiber Garage Brush. For 3 sizes, requirements on proportions of Bassine and Tampico fiber, trim and setting of fiber, dimensions, shape, and finish of hardwood block and handle, number of rows and holes, size of holes, weight of fiber.

U. S. Gov., Federal Specifications Board 407; 1926. White Tampico Hand Scrub Brush. Requirements on kind of wood, size and shape of block, number and boring of holes in block, method of attachment and length of white Tampico fiber.

U. S. Gov., Federal Specifications Board H–B–151; 1930. Casting Brush. For one size, requirements on dimensions of hardwood block, number and size of bristle holes, dimensions of flat steel wire used for bristles, strands and length of wire in each bristle bundle, structural features.

U. S. Gov., Federal Specifications Board H–B–171; 1930. Cuspidor Brush. For fiber bristles wound on end of stick, requirements on dimensions of hardwood stick, dimensions and trim of Tampico mixture fiber brush, weight of stock, construction of brush.

U. S. Gov., Federal Specifications Board H–B–191; 1930. Dust Brushes, Ceiling and Wall. For 8 and 12 inch sizes, using Chinese or Russian bristle, requirements of variety, length, trim, and weight of bristle, kind of hardwood, dimensions and shape of block, number and depth of holes, size, material, and finish of handle, to equal standard sample in workmanship and material.

U. S. Gov., Federal Specifications Board H–B–211; 1930. Flat Painters' Dusters. For 4¼-inch size, requirements on general quality of Chinese or Russian bristle, type and finish of handle, setting of bristles, size of holes, width of block, thickness of bristle, number of knots, length and weight of bristle, to equal standard sample in workmanship, material, dressing, solidity, and stiffness of bristles.

U. S. Gov., Federal Specifications Board H–B–216; 1930. Round Painters' Dust Brushes. Requirements on general quality and dressing of Chinese or Russian bristle, type and finish of handle, knotting and setting of bristles, size of holes, number of knots, size of block, length and weight of bristle, to equal standard sample in workmanship and material.

U. S. Gov., Federal Specifications Board H–B–291; 1930. Clothes Scrubbing Brush. Requirements on dimensions and shape of hardwood block, number, size and arrangement of bristle holes, securing of palmetto fiber bristles.

U. S. Gov., Federal Specifications Board H–B–531; 1930. Deck Scrubbing Brush. For 10-inch block brush with 51-inch round handle, requirements on dimensions and shape of maple or birch block and handle, number and dimensions of bristle holes, length, slant, and trim of palmyra fiber bristles, setting of bristles, finish.

U. S. Gov., Federal Specifications Board H–B–541; 1930. Hand Floor Scrubbing Brush. For one type, grade, and size, requirements on dimensions of hardwood block, number and size of bristle holes, length of palmetto fiber bristles, minimum weight of fiber.

References.—Floor sweeps. *See also* 981.4, 981.0.

982.4 POLISHING BRUSHES

U. S. Gov., Federal Specifications Board 191; 1924. Blacking and Dauber Brush. For blacking brush and for dauber brush, requirements on dimensions of beech, maple or birch block, number, sizes, and arrangement of bristle holes, length and securing of horsehair bristles.

982.5 BRUSHES FOR INDUSTRIAL USE

References.—Wire and fiber cleaning brushes. *See also* 982.3. Paint and stencil brushes. *See* 982.2. Hair sweeping brushes. *See* 981.4.

982.6 CARBON BRUSHES

References.—Carbon brushes for electric motors. *See* 711.42.

982.9 MISCELLANEOUS BRUSHES

Institute of American Meat Packers. Packinghouse Supplies, Packs, and Equipment; 1928.

Government Stamping Brush. Of Chinese bristle for ink pad use, size of block, length of bristle, number of rows.

U. S. Gov., Federal Specifications Board H–B–291; 1930. Flat Glue Brushes. For 3 sizes, requirements on general quality and type of Russian bristle, on shape, size, and finish of handle, material, size, thickness and construction of ferrule, setting, length, and minimum weight of bristle, equal in workmanship and material to standard sample.

U. S. Gov., Federal Specifications Board H–B–301; 1930. Round Glue Brushes. For 3 sizes, requirements on quality and dressing of Chinese bristle, shape and size of wooden handle, material and size of ferrule, depth of and method of setting bristle, length and minimum weight of bristle, equal in material and workmanship to standard sample.

References.—Dental brush wheels. *See* 915.10. Hair sweeping brushes. *See* 981.4.

983. MOPS

983.1 MOP STICKS

U. S. Gov., Dept. of Commerce, Bureau of Standards CS2–30; 1930. Mopsticks. A commercial standard selected and accepted by industry. Covers spring lever type, spring lever type with collar, both in domestic size and in janitor size, and janitor's screw type, requirements on dimensions and tolerances of wooden handle, gage thickness, materials, methods of fastening of head, spring, lever, bale, collar, coating requirements.

990–999 MISCELLANEOUS ARTICLES

991. MATCHES

U. S. Gov., Federal Specifications Board EE–M–101; 1930. Safety Matches. For 2-inch long matches, packed 50 to box, ignitable on special coating provided, test requirements for count, ignition test, damp proof test, and heating test.

992. BUTTONS

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. For gilt, silver, and bronze embossed buttons, requirements on sizes, construction, and finish of buttons and on types and construction of sewing shanks.

American Marine Standards Committee. O No. 27–1930. Uniforms for Merchant Marine Officers. Buttons. For plain buttons of bone, vegetable ivory, or composition, requirements on colors, general qualities, and finish.

993. BREATHING AND DIVING APPARATUS

National Safety Council. Approved by American Standards Assn. as K13–1930. Code for Identification of Gas-Mask Canisters. Published as Bull. No. 512 of Bureau of Labor Statistics of U. S. Dept. of Labor. Assigns definite colors to gas mask canister dependent on kind of gas, smoke, or mist with which it is supposed to be used. For gas masks used in industrial plants, mines, rescue work, fire fighting, etc.

U. S. Gov., Dept. of Commerce. Bureau of Mines. Schedule 13A; 1930. Procedure for Establishing a List of Permissible Self-Contained Oxygen Breathing Apparatus. For use in irrespirable and poisonous gases, half-hour apparatus and 2-hour apparatus, requirements on absorption of carbon dioxide from expired air, on temperature of inspired air, capacity of face attachment, weight, capacity of breathing bags, valves, and other structural features, permissible pressures, walking and load carrying tests with each size, etc.

U. S. Gov., Dept. of Commerce. Bureau of Mines. Schedule 19; 1927. Procedure for Testing Hose Masks for Permissibility. Requirements for approval for use in irrespirable atmospheres, tests of hose for permeation of gasoline vapor, collapsing pressure, strength and tightness of couplings and hose, resistance to air flow, structural features of face piece, eyeglasses, valves, harness, blower, tests on men walking and exercising, etc.

994. PIPES AND SMOKERS' OUTFITS

997. LAMPS AND ILLUMINATING DEVICES (EXCEPT ELECTRIC LAMPS)

997.1 OIL LAMPS, LANTERNS, TORCHES

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Engineers Torch. Dimensions and design for recommended standard cylindrical torch of brass and steel.

American Railway Assn. Mechanical Div. Recommended Practice. Tinware, Standardization of; 1915. Torch. Dimensions and design of recommended standard conical shape torch of tin or cold rolled steel.

American Railway Assn. Operating Div. Circular 2091; 1920. Lantern for Use on Crossing Gates and by Highway Crossing Watchmen and Gatemen. Dimensioned drawings showing details of construction and materials for oil lantern.

American Railway Assn. Signal Section 13726; 1926. Oil Lighted Lamps. Dimensions of wire bails, method of tinning and composition of tinning alloy, requirements for and method of japanning, wind and high temperature operation tests where required.

American Society for Testing Materials D 187–30; 1930. Method of Test for Burning Quality of Kerosene Oils. Includes dimensional specifications for test lamp, dimensions of standard brass Saybolt test lamp, of Miller No. 2 Sun hinge burner, and Macbeth-Evans No. 514 Pearl top chimney.

American Society for Testing Materials D 219–30; 1930. Method of Test for Burning Quality of Long Time Burning Oil for Railway Use. Includes specifications for test lamp, using standard Am. Rwy. Assn. semaphore lamp, dimensions of burner, dimensions of glass chimney, construction and dimensions of felt wick.

American Society for Testing Materials D 239–30; 1930. Method of Test for Burning Quality of Mineral Seal Oil. Includes specifications for test lamp, dimensions of font, burner, and chimney for Dressel No. 520 side lamp.

References.—Iron and steel sheets. *See* 604.2. Brass sheets and plates. *See* 644.21. Glass lantern globes and lamp chimneys. *See also* 524. Oil lamps for incubators. *See* 614.9.

997.2 GAS AND GAS APPLIANCES

American Gas Assn. Approval Requirements for Clothes Dryers; 1931. For gas heated dryers of cabinet type and rack type, requirements on thicknesses of metal parts, dimensions of cocks, sizes of clothes rods, structural features of dryer, test requirements for burner operation, temperature limiting devices, pilot, heating capacity, drying efficiency, fire hazard, draft hoods, etc.

American Gas Assn. Approval Requirements for Gas Heated Ironers; 1931. Construction requirements for burners, cocks, combustion chamber, thickness of metal, stability requirements, test requirements for burner operation, heat distribution, pressure distribution, explosion and fire hazards, ironer operation, and efficiency.

American Gas Assn. Approval Requirements for Portable Incinerators; 1930. Requirements on thicknesses of metal parts, materials and construction of parts, strength of incinerator, gas burner construction, test requirements for burner and pilot operation, incinerating efficiency, leakage, fire hazard, etc.

American Gas Assn. Standard Gas Fixture Specifications; 1920. For brass pipe or tubing or for iron or steel pipe fixtures. Wall thicknesses, size of threads, for goose neck, stems and arms, construction and assembly requirements, construction and some dimensional requirements for standard gas fixture cock.

American Gas Assn. and Natural Gasoline Assn. of America. Tentative Code for Testing Natural Gas for Gasoline Content; 1927. Specification and diagram of apparatus, test procedure and calculation of results for three methods of test; compression and cooling test, oil absorption test, and charcoal absorption test.

American Gas Assn. Report of Committee on Uniform Oil Efficiency; 1926 and 1927 Reports of Water Gas Committee of A. G. A. Committee recommends the adoption of the Pacific Coast Method with the Providence Modification as the official method for calculation of oil efficiencies for straight water gas operation with coke or anthracite coal but not bituminous coal. Explanation of method and calculations required.

American Gas Assn. Report of Water Gas Committee. Published annually. Gives reports of committee on apparatus and methods used by different gas manufacturers and conclusions resulting from the investigations.

National Board of Fire Underwriters. Compressed Gas Systems other than Acetylene for Lighting and Heating; 1927. Requirements on changing connections, location and storing of cylinders, location of regulating valves, dimension limits, material, and pressure test requirements for tubing.

U. S. Gov., Dept. of Commerce, Bureau of Standards C32; 1920. Standards for Gas Service. Proposed rules for State commissions and a proposed city ordinance recommended by bureau covering definition of a cubic foot of gas, general service provisions, testing equipment and testing to be provided by utility, requirements on accuracy of meters, on maintenance of heating value, permissible amounts of impurities, permissible pressure variation, relations with public, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards C48; 1914. Standard Methods of Gas Testing. Methods recommended are intended for use by State or city testing and inspection officials with some selection of methods permitted in each case. Covers measurement of quantity of gas, measurement of heating value, determination of candle power, and of impurities, meter testing procedure, determination of humidity, etc.

U. S. Gov., Dept. of Commerce, Bureau of Standards T89; 1917. Specific Gravity Balance for Gases. Describes development and construction of balance beam type of apparatus for measuring density of gases, directions for operation, accuracy, includes portable types.

U. S. Gov., Dept. of Commerce, Bureau of Standards T94; 1917. Effusion Method of Determining Gas Density. Describes the construction and use of an orifice type of apparatus for determination of density and the precautions to be used for obtaining consistent results, accuracy to be expected. For more accurate apparatus the specific gravity balance described in T89 of Bureau of Standards is recommended.

U. S. Gov., Dept. of Commerce, Bureau of Standards T114; 1919. Portable Cubic Foot Standard for Gas. Describes the design of a cubic foot volume standard for measuring gas more compact and portable than cubic foot bottles commonly in use, describes method of using new standard in calibrating gas meter provers.

U. S. Gov., Dept. of Commerce, Bureau of Standards T304; 1926. Method for Testing Gas Appliances to Determine Their Safety from Producing Carbon Monoxide. For forced tests and normal operation tests, description of tests developed at Bureau for determination of flash-back, blow-off, and yellow-tip curves, determination of limit of complete combustion, and of normal injection curve, typical test results.

References.—Brass pipe and tubing. *See also* 645.23, 645.24. Iron pipe. *See also* 607.1, 607.2, 607.3. Insulating joints for combination electric and gas fixtures. *See* 716.32. Electric fixtures. *See* 716.32. Gas stoves, gas house heating furnaces. *See* 614.2, 614.4. Gas producers. *See* 756.

997.3 GLOBES, SHADES, LAMP CHIMNEYS

References.—Glass lantern globes and lamp chimneys. *See* 524.

997.4 GASOLINE VAPOR MACHINES, SYSTEMS, AND LAMPS

National Board of Fire Underwriters. Gasoline Vapor Gas Machines, Lamps, and Systems; 1926. Covers machines with outside carbureters, machines with inside carbureters, systems with outside tank and inside generator, inside tank and inside generator, and gasoline vapor lamps. Location and protection of carbureter, requirements for pressure supply equipment and mixer, installation, connection, minimum sizes, and pressure test requirements for piping and tubing, installation and operating requirements for generators and vapor lamps, capacity, construction and location of tanks.

Underwriters' Laboratories. Compressed Gas Systems other than Acetylene for Lighting and Heating; 1928. For systems introducing gas only into building, and for systems introducing liquid, maximum pressures of gas or liquid, provision of regulators, valves, gauges, mercury seal; material, thickness of metal, and construction requirements for cabinets, tubing, expansion tanks, stoves and ranges.

997.5 ACETYLENE EQUIPMENT AND LAMPS

National Board of Fire Underwriters. Installation and Operation of Acetylene Equipment for Lighting, Heating and Cooking; 1930. Covers 6 classes of equipment, as stationary, automatic, portable, dissolved acetylene, etc., for use in and about buildings. Requirements on location of generator, construction, ventilation, and heating of outside generator houses, sizes and capacities of pipe, requirements for conductor and escape piping, operation of generators, storage and installation of cylinders, storage of calcium carbide.

Underwriters' Laboratories. Acetylene Generators for Lighting; 1926. Construction and performance of stationary automatic and nonautomatic, semiportable automatic and portable, for inside, outside installation and central station service, also dissolved acetylene in cylinders and portable

table lamps. For generators of iron or steel materials, rating, operation, permissible pressure and pressure variation with load, construction of sheet metal joints, construction, assembly, minimum gage of metal requirements for generating chamber, carbide holder, feed mechanism, gas holder, piping connections, safety reliefs, and accessories to meet certain specified operating and safety conditions. For cylinders, requirements on permissible pressure, pressure regulators and relief, testing according to I. C. C. specifications. For lamps, requirements on stability, maximum consumption in addition to above requirements for generators.

U. S. Gov., Dept. of Commerce. Steamboat Inspection Service. General Rules and Regulations Prescribed by Board of Supervising Inspectors; 1929. (4 manuals for ocean, bay, lake, and river vessels.) Self Igniting Water Lights. For ring buoys and life rafts, mandatory requirements on construction and sheet thickness of copper container, provision and operation of water admitting plug, properties of calcium carbide and calcium phosphide provided, candle power and endurance of light.

References.—Acetylene storage cylinders. *See also* 956.1. Acetylene headlamps for automobiles. *See* 722.33. Calcium carbide. *See* 833.1.

997.6 MINERS' LAMPS AND GAS DETECTORS

U. S. Gov., Dept. of Commerce, Bureau of Mines Schedule 7B; 1922. Procedure for Establishing Lists of Permissible Flame Safety Lamps and Methane Detectors of Flame Type. Test requirements on operation of lamp and detector and igniter in explosive atmospheres moving at various speeds and directions, construction requirements for lamps, detectors, locks, gauzes, glasses, recommendation on fuel capacity, candle power, angle of light, wick adjustment for lamps, scope of approval for use in gaseous mines, etc.

References.—Electric miners lamps and gas detectors. *See* 716.13, 716.17.

998. SIGNS AND SIGNBOARDS

American Assn. of State Highway Officials. Manual and Specifications for U. S. Standard Road Markers and Signs, 1929. Standard designs, shapes, dimensions, colors, and lettering of highway route markers, caution signs, warning signs, and information signs, specifications for materials, construction, and paint requirements for signs as proposed by Joint Board on Interstate Highways, uniform erection and location rules.

American Engineering Council. Street Traffic Signs, Signals and Markings; 1930. Submitted to American Standards Assn. for approval. Street Traffic Signs. Recommendations on standard shapes and dimensions for various types of traffic signs, color code for lettering and backgrounds, illumination, height and location, lettering and sign design, requirements on quality and kinds of wood, chemical composition for sheet metal, cast iron according to A. S. T. M. Spec. A 47 or A 48, cast steel according to A. S. T. M. Spec. A 88, cast aluminum according to A. S. T. M. Spec. B 26, painting and enameling requirements, composition of pigments, paints, and enamel.

American Railway Assn. Operating Div. Circular 2089; 1920. Metal Signs for Car Inspectors. Standard blue metal signals to be 10 by 14 inches.

American Railway Assn. Operating Div. Exhibit "A"; 1922. Approach Warning Sign. Dimensions of sign and lettering, colors, for one size standard design sign warning of approach to a railroad.

American Railway Assn. Operating Div. Exhibit "B"; 1922. Hand Sign for Highway Crossing Watchmen. Dimensions of sign and lettering of standard design of stop sign for holding in hand.

American Railway Assn. Signal Section. Signs or Markers for Conveying Instructions to Enginemen; 1918. Design, dimensions, painting, and night light indication for stop, speed, whistle and various signs.

American Railway Engineering Assn. 1929 Manual. Grade Crossings. Highway Crossing Signs; 1929. Dimensions and finish of standard wood post crossing sign, approximate location of sign and signal for wig-wag or flashlight signal on signs so equipped, dimensions of advance warning sign.

American Railway Engineering Assn. 1930 Supplement to 1929 Manual. Grade Crossings. Highway Crossing Warning Sign. For Flagman Off Duty sign, requirements on dimensions and shape of sheet steel sign, size and shape of letters, colors, method of attaching sign to support post.

National Conference on Street and Highway Safety. Manual on Street Traffic Signs, Signals and Markings; 1930. For signs of cast iron or aluminum, sheet steel or aluminum, or wood, requirements on chemical composition of sheet steel with other metals according to A. S. T. M. specifications, types and quality of wood, construction and thickness of sign, standard shapes, dimensions, colors, lettering and wording for various standard indications, requirements for paints, height and location of signs.

Outdoor Advertising Assn. of America. Manual, 1926 and Supplement; 1931. Painted Bulletins. For one standard size of city or suburban bulletin with and without platform, number and size of posts and rails, details of construction, bracing, cornice, column, base moulding details, method of construction illustrated in dimensioned drawings, standard colors used, covers wood frame and steel construction, illumination.

Outdoor Advertising Assn. of America. Manual, 1926 and Supplement; 1931. Painted Bulletins. Standard highway bulletin, and standard railroad bulletin, standard sizes, number and sizes of posts and rails, details and method of construction illustrated by dimensioned drawings, for wood frame or steel construction, standard paint colors, standard illumination.

Outdoor Advertising Assn. of America. Manual, 1926 and Supplement; 1931. Painted Bulletins. For standard roof bulletin, standard store bulletin, and city and suburban painted walls, requirements on standard sizes of store bulletins, illustrated standard construction of roof and store bulletin and painting of painted walls, standard paint colors and illumination.

Outdoor Advertising Assn. of America. Manual, 1926 and Supplement; 1931. Standard Poster Panels. Requirements on number and sizes of posts, anchors, braces, rails, moulding and capping for standard panel frames of wood or metal, thickness and galvanizing of metal panel surface, number of reflectors and size of lamps, standard construction illustrated with dimensioned drawings, standard colors for mouldings.

References.—Electric signs. *See* 716.31. Iron and steel sheets. *See* 604.2, 604.3. Zinc coatings on sheets. *See also* 600.3. Yard lumber, structural timbers. *See also* 402.4, 412.

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Information on method of procurement of other specifications issued by the various bureaus and agencies of the several departments or establishments of the Federal Government can best be obtained directly from the Washington, D. C., headquarters of the bureaus and agencies concerned.

In making inquiries concerning specifications, care should be taken to give both the title and designating number of the specification. In some cases the specification may be a part of some "manual" and not have any identifying number. In these cases the title of the manual or other publication is usually stated in the directory immediately following the name of the organization which issues the specification.

The specifications and standards listed under the classifications 400–499 and 500–599 of the directory will be found printed in full or abstracted in two volumes of the Encyclopedia of Specifications, (1) Standards and Specifications in the Wood Using Industries, published in June, 1927, and (2) Standards and Specifications for Nonmetallic Minerals and Their Products, published in March, 1930. These two volumes contain the nationally recognized standards and specifications which were current at the time of publication. They may be obtained from the Superintendent of Documents, Government Printing Office, Washington, for $1.50 and $2.75, respectively.

NAMES AND ADDRESSES OF STANDARDIZING AGENCIES

Below are listed the trade associations, technical societies, and other standardizing agencies whose specifications and standards will be found listed in the Directory of Commodity Specifications. The numbers appearing after each organization refer to the group classifications in the body of the directory under which that individual organization's specifications have been listed.

Abrasive Paper and Cloth Manufacturers Exchange, R. P. Carlton, chairman, standardization committee, care of Minnesota Mining & Manufacturing Co., 797 Forest Street, St. Paul, Minn. 304.4; 304.5; 306.36; 379.4; 470.3; 479.3; 541.4.

Agricultural Insecticide and Fungicide Manufacturers Association, G. B. Heckel, secretary, Public Ledger Building, Philadelphia, Pa. 881.21; 881.23.

Amateur Athletic Union of the United States. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 069.1; 209.91; 209.92; 429.9; 729.6; 943.1; 943.94; 943.96; 943.99.

American Association for the Advancement of Science and Associated Societies, Burton E. Livingston, general secretary, Smithsonian Institution Building, Washington, D. C. 700; 706.0; 716.0; 716.30; 719.63; 724.0; 755.0; 910.

American Association of Cereal Chemists, M. D. Mize, secretary-treasurer, 833 Omaha Grain Exchange, Omaha, Nebr. 103.0; 104.0; 107.0; 107.1; 107.3; 108.0; 117.0.

American Association of Medical Milk Commissions (Inc.), Harris Moak, secretary, 360 Park Place, Brooklyn, N. Y. 021.1; 518.51.

American Assn. of Nurserymen, Charles Sizemore, Secretary, Louisiana, Mo. 251.; 259.

American Association of State Highway Officials, W. C. Markham, secretary, National Press Building, Washington, D. C. 392.4; 400.12; 400.42; 400.43; 401.41; 401.42; 401.43; 401.44; 401.45; 401.46; 401.47; 401.49; 402.3; 412.0; 412.1; 412.2; 412.9; 500.; 503.0; 504.0; 505.0; 505.13; 505.15; 505.16; 505.19; 505.20; 505.30; 505.31; 505.32; 505.35; 511.70; 511.71; 511.72; 511.9; 512.10; 512.11; 512.12; 512.13; 512.14; 512.15; 512.16; 512. 2; 516.0; 516.11; 516.3; 516.4; 518.22; 518.30; 518.35; 518.37; 518.41; 518.42; 518.43; 518.44; 518.45; 518.46; 518.60; 518.61; 518.72; 518.81; 518.82; 518.83; 531.5; 534.10; 534.21; 600.1; 600.3; 603.42; 604.29; 605.11; 605.21; 605.25; 607.11; 607.5; 718.5; 722.32; 743.; 793.5; 801.3; 839.38; 844.67; 998.

American Association of Textile Chemists and Colorists, Alex. Morrison, secretary, care of American Woolen Co., Andover, Mass. 300.4; 392.3; 397.0; 770.; 803.10.

American Automobile Association, Ernest N. Smith, executive vice president, Pennsylvania Avenue at Seventeenth Street NW., Washington, D. C. 481.; 482.; 619.2; 722.32; 722.38.

American Bleached Shellac Manufacturers Association (Inc.), R. W. McClintock, secretary, 80 Cliff Street, New York, N. Y. 846.11; 846.62.

American Bottlers of Carbonated Beverages, Junior Owens, secretary, 726 Bond Building, Washington, D. C. 176.0; 607.6; 681.49; 766.1; 781.; 871.29; 953.36; 955.1.

American Bowling Congress. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 429.9; 943.1; 943.98.

American Bureau of Shipping, Charles A. McAllister, president, Stevenson Taylor Memorial Building, 24 Old Slip, New York, N. Y. 603.1; 603.21; 603.42; 603.52; 603.53; 603.57; 604.11; 604.13; 604.14; 605.14; 605.15; 607.14; 607.4; 607.6; 608.4; 611.11; 611.3; 611.41; 611.49; 611.51; 611.59; 641.21; 641.22; 642.23; 642.24; 644.21; 644.22; 645.21; 645.23; 645.24; 646.41; 701.1; 701.2; 703.1; 703.2; 703.9; 704.1; 705.7; 711.11; 711.12; 711.21; 711.22; 714.11; 714.42; 714.51; 715.41; 719.55; 719.56 725.40; 725.42; 956.2.

American Bureau of Welding, William Spraragen, secretary, division of engineering, National Research Council, 29 West Thirty-ninth Street, New York, N. Y. 767.

American Ceramic Society, Ross C. Purdy, general secretary, 2525 North High Street, Columbus, Ohio. 511.2; 512.12; 517.2; 520.; 531.0; 531.6; 534.10; 546.; 594.; 918.0.

American Chemical Society, Charles L. Parsons, secretary, Mills Building, Washington, D. C. 093.7; 142.0; 231.; 471.2; 503.0; 504.0; 532.21; 815.1; 820.; 821.1; 821.3; 821.4; 821.5; 821.6; 821.7; 821.9; 822.1; 822.4; 822.5; 830.; 831.1; 831.3; 831.4; 831.5; 831.6; 831.7; 831.9; 832.2; 832.3; 832.4; 833.2; 833.3; 834.1; 834.2; 834.4; 834.5; 834.8; 834.9; 835.1; 835.2; 835.4; 835.5; 836.9; 837.2; 837.9; 839.1; 839.33; 839.35; 839.36; 839.37; 839.38; 839.39; 839.6; 839.7; 839.9; 846.5; 848.0; 871.0; 918.1; 918.2; 918.3; 918.4; 918.6; 918.7; 918.9.

American College of Surgeons, Malcolm T. MacEachern, M. D., associate director and director of hospital activities, 40 East Erie Street, Chicago, Ill. 398.34; 915.0.

American Concrete Institute, Harvey Whipple, secretary, 2970 West Grand Boulevard, Detroit, Mich. 510.; 512.11; 512.13; 512.14; 512.2; 516.0; 516.11; 516.12; 516.19; 516.2; 516.3; 516.4; 516.5; 518.31; 518.50; 518.56; 518.58; 518.59; 518.61; 518.62; 518.63; 518.64; 518.65; 518.67; 518.71.

American Cranberry Exchange, C. M. Chaney, secretary, 90 W. Broadway, New York, N. Y. 132.11.

American Dental Trade Association, George A. Lilly, managing director, 839 Seventeenth Street, NW., Washington, D. C. 915.10.

American Drop Forging Institute, Paul A. Androus, secretary, 405 First Trust and Deposit Building, Syracuse, N. Y. 760.

American Drug Manufacturers Association, Carson P. Frailey, secretary, Albee Building, Washington, D. C. 819.9; 955.1.

American Dry Milk Institute (Inc.), Roud McCann, director, 221 North La Salle Street, Chicago, Ill. 021.7.

American Electric Railway Engineering Association, G. C. Hecker, general secretary, 292 Madison Avenue, New York, N. Y. 202.11; 363.1; 400.42; 400.43; 401.11; 401.12; 401.13; 401.14; 401.15; 401.16; 401.17; 401.18; 401.31; 401.32; 402.1; 412.2; 427.; 429.7; 502.2; 505.37; 511.73; 516.9; 518.10; 518.20; 518.31; 518.41; 518.51; 518.65; 518.9; 525.3; 532.22; 534.29; 594.; 600.1; 600.2; 600.3; 603.1; 603.26; 603.27; 603.33; 603.42; 605.19; 605.20; 606.0; 606.1; 606.2; 606.3; 606.4; 606.5; 606.6; 607.4; 607.5; 608.2; 608.31; 608.32; 608.6; 611.11; 611.18; 611.21; 611.22; 611.29; 611.41; 611.43; 611.44; 611.52; 611.53; 611.55; 611.59; 616.35; 619.2; 619.9; 622.1; 622.2; 622.5; 622.9; 631.32; 646.41; 646.59; 692.0; 692.1; 692.2; 692.3; 703.0; 703.2; 715.11; 715.12; 715.30; 715.36; 715.40; 715.41; 715.44; 716.30; 716.39; 718.40; 719.55; 719.60; 719.62; 719.63; 723.0; 726.0; 726.1; 726.2; 767.; 801.3; 970.

American Engineering Council, L. W. Wallace, secretary, 26 Jackson Place, Washington, D. C. 718.5; 844.9; 998.

American Face Brick Association, 205 West Wacker Drive, Chicago, Ill. 534.11.

American Foundrymen's Association (Inc.), C. E. Hoyt, executive secretary, 222 West Adams Street, Chicago, Ill. 429.9; 512.12; 534.12; 574.

American Gas Association (Inc.), Alexander Forward, managing director, 420 Lexington Avenue, New York, N. Y. 202.31; 607.0; 607.12; 607.6; 614.0; 614.2; 614.4; 645.9 997.2.

American Gear Manufacturers Association, T. W. Owens, secretary, 3608 Euclid Avenue, Cleveland, Ohio. 611.55; 765.; 766.1.

American Hospital Association, W. P. Morrill, M. D., chairman, committee on simplification and standardization, Maine General Hospital, Portland, Me. 011.91; 012.91; 014.1; 015.1; 126.11; 126.13; 126.2; 126.7; 134.22; 134.24; 134.41; 134.42; 134.44; 134.45.

American Hotel Association of the United States and Canada, Thomas D. Green, president, 221 West Fifty-seventh Street, New York, N. Y. 871.12; 871.13; 871.15; 871.21; 871.22; 871.23; 871.26; 871.27.

American Institute of Architects, LeRoy E. Kern, technical secretary, structural service department, 1741 New York Avenue, NW., Washington, D. C. 518.50; 605.0; 710.; 716.30; 745.3.

American Institute of Baking, Henry Stude, president, 1135 Fullerton Avenue, Chicago, Ill. 100.; 108.1.

American Institute of Electrical Engineers, F. L. Hutchinson, national secretary, 33 West Thirty-ninth Street, New York, N. Y. 524.; 532.22; 600.3; 631.32; 645.24; 646.42; 700.; 701.2; 704.1; 706.0; 710.; 711.11; 711.12; 711.21; 711.22; 711.3; 712.2; 713.1; 713.2; 713.5; 714.11–714.14, incl.; 714.30; 714.42; 714.51; 714.52; 715.11; 715.12; 715.21; 715.36; 715.40; 715.41; 715.44; 715.50; 715.51; 716.0; 716.2; 716.30; 716.32; 717.1; 718.0; 718.39; 718.40; 718.60; 718.62; 718.63; 718.64; 718.66; 719.50; 719.55; 719.56; 719.63; 724.0; 755.0; 910.

American Institute of Homeopathy, Garth W. Boericke, M. D., chairman pharmacopœia committee, care of Hahnemann Medical College, Philadelphia, Pa. 042.2; 212.; 221.; 222.; 801.3; 801.4; 802.1; 802.2; 803.11; 803.31; 810.; 811.; 813.1; 813.2; 813.9; 814.1; 814.2; 819.1; 819.9; 821.1; 821.2; 821.3; 821.4; 821.5; 821.6; 821.7; 821.9; 822.4; 823.; 831.1; 831.3; 831.4; 831.5; 831.6; 831.9; 832.1; 832.2; 832.3; 832.4; 833.2; 833.3; 833.5; 833.9; 834.2; 834.3; 834.4; 834.8; 834.9; 835.1; 835.2; 835.7; 835.8; 836.3; 836.9; 837.2; 838.1; 838.2; 838.9; 839.31; 839.33; 839.34; 839.35; 839.36; 839.37; 839.38; 839.39; 839.44; 839.6; 839.9.

American Institute of Mining and Metallurgical Engineers, A. B. Parsons, secretary, 29 West Thirty-ninth Street, New York, N. Y. 511.9; 599.; 750.

American Institute of Steel Construction (Inc.), Charles F. Abbott, executive director, 200 Madison Avenue, New York, N. Y. 605.0; 605.22.

American Leather Chemists Association, H. C. Reed, secretary, 143 West Twentieth Street, New York, N. Y. 040.; 043.0; 060.; 231.; 821.9.

American Marine Standards Committee, A. V. Bouillon, secretary, Department of Commerce Building, Washington, D. C. 202.0; 202.12; 202.22; 202.41; 202.42; 202.44; 202.46; 303.1; 303.2; 304.4; 306.34; 306.36; 311.1; 311.6; 311.92; 315.10; 315.14; 315.2; 315.30; 315.31; 315.4; 315.6; 316.1; 316.2; 316.4; 319.3; 319.4; 339.3; 339.50; 365.13; 365.16; 365.18; 365.98; 368.2; 368.82; 369.21; 369.6; 369.7; 392.53; 392.54; 395.11; 395.13; 395.14; 399.9; 505.13; 505.36; 516.3; 521.1; 523.9; 531.3; 532.1; 534.12; 545.2; 545.4; 593.; 603.42; 603.52; 604.11; 607.0; 607.4; 607.7; 608.2; 608.31; 608.32; 608.52; 608.7; 611.13; 611.14; 611.19; 611.49; 613.1; 617.21; 617.22; 617.23; 617.31; 617.32; 617.35; 617.42; 617.43; 617.5; 617.61; 619.9; 645.21; 645.22; 646.41; 646.59; 647.38; 691.2; 703.0; 703.1; 703.9; 707.23; 707.40; 707.41; 707.42; 707.43; 707.44; 707.45; 725.3; 725.41; 725.42; 725.43; 793.2; 915.43; 915.50; 956.2; 957.19; 974.3; 992.

American Medical Association, Council on Pharmacy and Chemistry, W. A. Puckner, secretary, 535 North Dearborn Street, Chicago, Ill. 810.

American Mining Congress, J. F. Callbreath, secretary, Munsey Building, Washington, D. C. 401.10; 412.0; 504.43; 603.42; 606.0; 606.3; 710.; 721.1; 726.1; 751.; 755.1; 970.

American Oil Burner Association (Inc.), Harry F. Tapp, executive secretary, 342 Madison Avenue, New York, N. Y. 503.4.

American Oil Chemists' Society, J. C. P. Helm, secretary, 705 Tchoupitoulas Street, New Orleans, La. 112.3; 141.; 142.0; 142.1; 142.3; 142.4; 142.6; 143.2; 503.1; 614.9; 871.0.

American Paper and Pulp Association, Jesse H. Neal, general manager, 370 Lexington Avenue, New York, N. Y. 400.50; 470.1.

American Petroleum Institute, W. R. Boyd, jr., executive vice president, 250 Park Avenue, New York, N. Y. 066.3; 207.3; 314.1; 331.16; 332.; 518.9; 603.42; 605.23; 607.0; 607.3; 607.4; 608.52; 611.16; 611.52; 615.82; 703.0; 703.1; 705.3; 711.21; 754.; 766.1.

American Pharmaceutical Association, E. F. Kelly, secretary, 10 West Chase Street, Baltimore, Md. 151.2; 152.2; 211.1; 221.; 222.; 501.6; 531.4; 541.5; 803.24; 810.; 811.; 813.7; 813.9; 819.1; 819.4; 819.9; 821.9; 831.6; 831.9; 832.4; 833.9; 834.9; 838.3; 838.5; 839.31; 839.34; 839.35; 839.36; 839.38; 839.39; 839.9; 872.2.

American Physical Education Association. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 069.1; 317.7; 429.9; 943.1; 943.97.

American Public Health Association, Kendall Emerson, M. D., acting executive secretary, 370 Seventh Avenue, New York, N. Y. 021.0; 882.0.

American Railway Association, H. J. Forster, secretary, 30 Vesey Street, New York, N. Y. 726.2; 793.5.

American Railway Assn., electrical section, E. H. Fritch, secretary, 59 East Van Buren St., Chicago, Ill. 401.30; 402.1; 516.9; 531.5; 532.22; 600.3; 605.23; 715.11; 715.41; 715.44; 716.10; 716.11; 719.55; 719.56; 719.60; 719.63.

American Railway Association, freight container bureau, Edward Dahill, chief engineer, 30 Vesey Street, New York, N. Y. 402.42; 421.2; 421.3; 438.0; 472.25; 477.2; 477.3; 477.4; 477.7; 477.9; 834.6; 950.; 951.13; 951.22; 952.10; 952.11; 953.2; 953.31; 953.36; 954.30; 954.35; 954.36; 959.1.

American Railway Association, mechanical division, V. R. Hawthorne, secretary, 59 East Van Buren Street, Chicago, Ill. 200.; 202.11; 202.12; 202.31; 202.41; 202.42; 202.44; 202.45; 207.3; 211.1; 301.12; 363.1; 411.1; 411.29; 411.7; 413.20; 413.21; 413.23; 413.24; 413.25; 413.29; 470.3; 473.3; 504.13; 526.6; 601.23; 602.2; 603.1; 603.21; 603.26; 603.33;

603.41; 603.52; 604.11; 604.25; 604.32; 605.13; 606.0; 607.2; 607.3; 607.4; 607.6; 608.0; 608.31; 608.32; 608.4; 608.51; 611.16; 611.18; 611.19; 611.21; 611.22; 611.40; 611.41; 611.42; 611.43; 611.44; 611.49; 611.50; 611.51; 611.52; 611.53; 611.54; 611.59; 612.29; 615.82; 616.99; 621.31; 621.32; 622.3; 622.5; 622.6; 622.9; 631.31; 645.11; 646.41; 681.41; 692.1; 692.2; 692.3; 701.3; 702.1; 702.9; 703.2; 707.13; 711.12; 714.11; 714.21; 714.22; 715.21; 716.10; 716.2; 716.39; 721.1; 726.1; 726.2; 789.; 794.; 841.41; 842.63; 842.64; 842.81; 844.61; 848.11; 848.12; 848.7; 848.9; 849.11; 849.19; 919.1; 951.63; 951.64; 959.1; 974.2; 997.1.

American Railway Association, operating division, J. C. Caviston, secretary, 30 Vesey Street, New York, N. Y. 306.43; 718.40; 863.; 997.1; 998.

American Railway Association, purchases and stores division, W. J. Farrell, secretary, 30 Vesey Street, New York, N. Y. 202.9; 303.0; 306.43; 331.16; 428.20; 518.51; 521.0; 600.2; 603.0; 603.32; 604.10; 604.20; 607.4; 608.12; 608.2; 608.31; 608.4; 608.51; 615.61; 621.35; 645.9; 700.; 707.40; 726.0.

American Railway Association, signal section, R. H. C. Balliet, secretary, 30 Vesey Street, New York, N. Y. 205.1; 400.42; 427.; 503.3; 503.5; 504.19; 504.6; 504.8; 511.53; 516.3; 516.9; 524.; 525.3; 531.5; 532.22; 600.3; 603.1; 603.42; 605.14; 607.3; 607.4; 611.11; 611.21; 631.32; 711.11; 711.12; 712.0; 712.1; 712.2; 712.3; 712.5; 713.5; 713.7; 714.11; 714.12; 714.21; 714.30; 714.31; 714.32; 714.33; 714.42; 714.51; 714.52; 715.11; 715.30; 715.41; 715.43; 715.44; 715.50; 715.51; 716.11; 718.33; 718.40; 718.41; 718.42; 718.43; 718.49; 719.52; 719.55; 719.56; 719.57; 719.59; 821.7; 839.33; 840.1; 954.29; 997.1; 998.

American Railway Association, telegraph and telephone section, W. A. Fairbanks, secretary, 30 Vesey Street, New York, N. Y. 046.; 069.3; 331.21; 400.42; 400.43; 402.1; 427.; 429.9; 435.5; 516.9; 518.65; 518.83; 518.9; 532.22; 600.3; 603.42; 608.2; 608.31; 611.12; 613.6; 655.6; 693.1; 712.1; 714.12; 714.21; 714.22; 715.11; 715.12; 715.30; 715.41; 715.42; 715.43; 715.44; 715.50; 715.51; 718.20; 718.22; 718.29; 719.55; 719.56; 719.60; 719.61; 719.62; 726.1.

American Railway Association, transportation division, G. W. Covert, secretary, 59 East Van Buren Street, Chicago, Ill. 950.

American Railway Engineering Association, E. H. Fritch, secretary, 59 East Van Buren Street, Chicago, Ill. 365.98; 392.4; 400.0; 400.12; 400.40; 400.42; 401.10; 401.11; 401.12; 401.13; 401.14; 401.15; 401.16; 401.17; 401.18; 401.21; 401.22; 401.24; 401.25; 401.29; 401.40; 401.41; 401.43; 401.44; 401.45; 401.46; 402.3; 412.0; 412.1; 412.2; 428.29; 429.9; 505.13; 505.14; 505.15; 505.16; 505.17; 505.19; 505.36; 511.3; 511.52; 511.73; 512.11; 512.12; 512.13; 512.14; 512.2; 514.4; 516.11; 516.2; 516.3; 516.4; 516.9; 517.2; 518.10; 518.31; 518.33; 518.35; 518.37; 518.42; 518.50; 518.52; 518.56; 518.57; 518.58; 518.61; 518.67; 518.84; 518.89; 532.23; 534.11; 534.22; 534.23; 534.24; 545.9; 600.3; 600.6; 603.21; 603.32; 603.42; 603.43; 604.22; 605.11; 605.12; 605.21; 605.22; 605.23; 605.25; 606.1; 606.2; 606.3; 606.4; 606.5; 607.11; 607.12; 607.5; 607.6; 608.11; 608.13; 611.11; 611.18; 611.19; 611.41; 611.51; 611.52; 615.22; 615.42; 615.82; 616.11; 616.61; 616.64; 616.8; 616.91; 619.3; 622.1; 622.5; 647.31; 692.1; 646.41; 647.31; 692.1; 692.2; 703.9; 711.21; 711.22; 714.11; 714.12; 714.42; 714.52; 715.30; 715.44; 718.41; 718.5; 719.55; 719.63; 792.0; 793.5; 801.3; 834.4; 838.3; 839.34; 839.38; 840.1; 882.0; 882.2; 956.2; 976.; 998.

American Society of Agricultural Engineers, Raymond Olney, secretary, St. Joseph, Mich. 729.5; 732.

American Society of Bakery Engineers, Victor E. Marx, secretary, 1541 Birchwood Avenue, Chicago, Ill. 786.; 956.2.

American Society of Civil Engineers, George T. Seabury, secretary, 33 West Thirty-ninth Street, New York, N. Y. 402.3; 516.11; 518.31; 518.32; 518.33; 518.34; 518.35; 518.36; 518.37; 518.38; 518.60; 605.21; 700.; 706.0; 719.63; 724.0; 755.0; 910.

American Society of Heating and Ventilating Engineers, A. V. Hutchinson, secretary, 51 Madison Avenue, New York, N. Y. 614.4; 791.1; 792.0; 792.1.

American Society of Mechanical Engineers, Calvin W. Rice, secretary, 29 West Thirty-ninth Street, New York, N. Y. 501.0; 503.0; 504.0; 505.0; 510.; 534.10; 603.1; 603.21; 603.23; 604.11; 604.19; 605.23; 606.4; 607.0; 607.14; 607.2; 607.4; 608.0; 608.2; 608.3; 608.32; 608.4; 608.52; 611.29; 611.41; 611.51; 611.52; 611.55; 611.59; 614.4; 615.15; 615.42; 615.82; 622.1; 645.9; 700.; 701.1; 701.2; 701.3; 703.0; 703.1; 703.9; 705.0; 706.0; 710.; 715.21; 716.0; 716.10; 716.30; 719.63; 724.0; 745.3; 755.0; 756.; 765.; 766.0; 766.1; 766.2; 785.0; 791.0; 793.0; 795.; 910.; 917.2; 919.80; 956.2; 974.0.

American Society of Municipal Engineers, C. W. S. Sammelman, secretary, 4359 Lindell Boulevard, St. Louis, Mo. 400.42; 401.43; 401.49; 402.3; 505.13; 505.14; 505.15; 505.19; 505.21; 505.31; 505.32; 505.35; 512.11–512.13; 512.15; 516.3; 516.5; 518.11; 518.23; 518.24; 518.25; 518.26; 518.27; 518.31; 518.32; 518.33; 518.34; 518.35; 518.36; 518.37; 518.63; 518.65; 518.67; 531.5; 534.10; 534.11; 534.21; 603.1; 801.3.

American Society of Refrigerating Engineers, David L. Fiske, secretary, 37 West Thirty-ninth Street, New York, N. Y. 711.21; 785.0.

American Society for Steel Treating, W. H. Eisenman, secretary, 7016 Euclid Avenue, Cleveland, Ohio. 600.5; 765.

American Society for Testing Materials, C. L. Warwick, secretary-treasurer, 1315 Spruce Street, Philadelphia, Pa. 142.0; 143.2; 200.; 202.0; 202.12; 202.41; 202.42; 202.44; 203.2; 206.0; 207.0; 208.1; 211.1; 216.; 300.4; 300.6; 302.10; 302.20; 302.40; 302.49; 303.0; 303.3; 303.8; 303.97; 304.4; 304.71; 306.24; 306.36; 309.0; 314.1; 322.1; 322.2; 360.; 365.98; 367.0; 370.; 392.4; 397.0; 399.7; 400.13; 400.42; 401.40; 402.3; 412.0; 413.52; 473.2; 500.; 501.0; 501.1; 501.2; 501.5; 502.0; 502.1; 502.2; 503.0; 503.2; 503.3; 503.5; 503.6; 503.7; 504.0; 504.54; 504.6; 504.8; 505.0; 505.13; 505.15; 505.16; 505.20; 505.29; 505.30; 505.31; 505.32; 505.34; 505.35; 505.36; 505.39; 510.; 511.2; 511.50; 511.53; 511.70; 511.71; 512.10; 512.11; 512.12; 512.13; 512.14; 512.15; 512.16; 512.2; 513.; 514.0; 514.1; 514.2; 514.3; 514.61; 514.62; 514.63; 516.0; 516.11; 516.12; 516.3; 516.4; 517.0; 517.2; 518.0; 518.12; 518.21; 518.50; 518.60; 518.61; 518.62; 518.67; 524.; 531.0; 531.5; 532.22; 534.10; 534.11; 534.12; 534.20; 534.21; 534.22; 545.4; 545.9; 594.; 600.1; 600.3; 600.4; 600.5; 600.7; 601.20; 601.23; 602.1; 602.2; 603.1; 603.21; 603.23; 603.24; 603.32; 603.33; 603.41; 603.42; 603.43; 603.52; 603.53; 603.57; 604.11; 604.13; 604.14; 604.19; 604.22; 604.23; 604.32; 605.11; 605.12; 605.13; 605.15; 605.19; 605.25; 606.1; 606.2; 606.4; 606.5; 607.11; 607.12; 607.14; 607.3; 607.4; 607.6; 608.11; 608.4; 611.11; 611.18; 611.21; 611.3; 611.41; 611.51; 611.52; 611.53; 611.54; 619.2; 621.11; 621.20; 621.21; 621.22; 621.24; 621.26; 621.30; 621.31; 621.32; 621.33; 621.34; 621.35; 622.1; 622.5; 622.6; 631.0; 631.12; 631.23; 631.41; 641.0; 641.11; 641.12; 641.21; 642.11; 642.23; 642.24; 642.4; 643.2; 643.3; 643.4; 644.11; 644.21; 645.11; 645.21; 645.23; 645.24; 645.39; 645.9; 646.0; 646.11; 646.41; 646.52; 647.15; 647.20; 647.21; 647.26; 651.0; 651.1; 653.0; 653.1; 656.0; 682.; 683.0; 683.1; 683.2; 683.3; 683.41; 692.0; 692.1; 692.2; 692.3; 693.1; 693.2; 693.3; 695.; 696.; 702.1; 702.2; 703.2; 707.3; 710.; 714.12; 715.41; 715.43; 715.44; 719.50; 719.51; 719.52; 719.55; 719.56; 719.57; 719.58; 770.; 801.3; 822.0; 822.1; 822.2; 833.2; 839.1; 839.38; 839.9; 840.3; 840.5; 841.41; 841.5; 842.1; 842.2; 842.3; 842.4; 842.5; 842.63; 842.64; 842.7; 842.86; 842.9; 844.1; 846.0; 846.11; 846.5; 846.63; 847.1; 847.2; 848.11; 848.12; 848.2; 848.4; 848.7; 849.3; 882.3; 918.1; 918.9; 919.82; 953.30; 953.37; 957.19; 997.1.

American Standards Association, Dr. P. G. Agnew, secretary, 29 West Thirty-ninth Street, New York, N. Y. 142.0; 202.41; 300.4; 399.7; 400.13; 401.10; 401.30; 401.31; 401.32; 401.36; 428.29; 429.4; 501.0; 502.2; 503.0; 503.3; 503.5; 503.6; 503.7; 504.0; 504.54; 504.6; 505.0; 505.20; 505.30; 510.; 512.10; 512.16; 518.50; 518.51; 532.22; 534.21; 541.3; 574.; 600.3; 603.1; 603.42; 604.14; 604.32; 605.25; 606.0; 606.2; 606.4; 607.0; 607.14; 607.2; 607.4; 608.0; 608.2; 608.31; 608.4; 608.52; 611.52; 611.55; 615.42; 615.82; 641.0; 645.11; 646.0; 647.20; 692.0; 693.1; 700.; 703.9; 706.0; 710.; 711.20; 711.3; 712.1; 712.2; 713.2; 713.5; 714.11; 714.34; 715.12; 715.30; 715.44; 715.50; 716.0; 716.12; 716.30; 718.0; 718.5; 718.60; 718.61; 718.62; 719.55; 719.60; 719.63; 722.32; 724.0; 745.3; 750.; 751.; 755.; 760.;

765.; 766.0; 766.1; 766.2; 768.; 770.; 782.; 783.; 784.0; 785.0; 787.; 789.; 840.5; 842.63; 849.3; 860.; 871.12; 910.; 911.1; 911.2; 912.; 914.5; 970.; 974.0; 993.

American Walnut Manufacturers' Association, Burdett Green, secretary, 616 South Michigan Boulevard, Chicago, Ill. 400.38.

American Water Works Association, Malcolm Pirnie, chairman, committee on water works practice, 25 West Forty-third Street, New York, N. Y. 517.2; 532.23; 607.12; 607.6; 619.5; 793.4; 833.2; 834.4; 834.8; 838.3; 839.33; 839.34; 839.8; 974.0.

American Welding Society, M. M. Kelly, 33 West Thirty-ninth Street, New York, N. Y. 767.

American Wood-Preservers' Association, Horace L. Dawson, secretary, 1104 Chandler Building, Washington, D. C. 400.40; 400.42; 400.43; 401.30; 401.40; 402.3; 404.0; 503.0; 504.0; 505.15; 505.30; 505.33; 505.37; 505.39; 801.3; 839.38; 918.2; 918.9; 919.82.

Anthracite Institute, E. W. Parker, secretary, 225 South Fifteenth Street, Philadelphia, Pa. 501.1.

Arkansas Soft Pine Bureau, Little Rock, Ark. 400.26; 402.41; 402.42; 402.43; 402.51; 411.1; 411.27; 411.3; 411.41; 411.42; 411.43; 411.5; 411.6; 411.7; 412.1; 413.4; 413.54; 413.8; 423.5.

Arkwright Club, William F. Garcelon, secretary, 605 Sears Building, Boston, Mass. 300.1.

Artistic Lighting Equipment Association, Charles L. Benjamin, managing director, 420 Lexington Avenue, New York, N. Y. 716.30.

Asbestos Bureau (Inc.), R. Tomlinson, president, Seattle, Wash. 707.42; 707.43; 707.44.

Asphalt Institute, J. E. Pennybacker, managing director, 801 Second Avenue, New York, N. Y. 505.14; 516.11; 518.12; 518.13; 518.14; 518.21; 518.22; 518.23; 518.27; 518.29; 518.37; 518.63; 518.64.

Asphalt Shingle and Roofing Institute, J. S. Bryant, manager, 2 West Forty-fifth Street, New York, N. Y. 365.98; 473.2; 505.0; 505.16; 510.; 511.50; 511.52; 600.3; 608.11.

Associated Cooperage Industries of America, Louis F. Horn, secretary, 2008 Railway Exchange Building, St. Louis, Mo. 421.1; 421.2; 421.3; 604.22.

Associated Factory Mutual Fire Insurance Companies, C. W. Mowry, manager, Inspection Department, 184 High Street, Boston, Mass. 202.41; 412.1; 503.0; 518.51; 518.9; 605.22; 605.23; 607.6; 607.10; 614.0; 614.9; 701.2; 703.9; 704.0; 705.3; 711.21; 711.22; 714.11; 715.50; 718.60; 755.1; 793.2; 840.2; 956.2; 974.0; 974.2; 976.

Associated General Contractors of America (Inc.), Edward J. Harding, managing director, Munsey Building, Washington, D. C. 742; 755.1.

Associated Knit Underwear Manufacturers of America, Roy A. Cheney, secretary, Mann Building, Utica, N. Y. 302.10; 309.0; 309.4; 367.2; 397.12; 953.2.

Associated Mfrs. of Water Purifying Equipment, Arthur M. Crane, secretary, P. O. Box, 307, Gary, Ind. 619.5.

Associated Tile Manufacturers (Inc.), H. L. Gaardsmoe, acting secretary, 420 Lexington Avenue, New York, N. Y. 516.3; 518.50; 518.53; 518.56; 518.57; 518.59; 518.73; 534.20; 534.25.

Association of American Feed Control Officials, L. E. Bopst, secretary, College Park, Md. 021.3; 021.9; 039.4; 098.1; 103.4; 112.0; 112.1; 112.2; 112.3; 112.4; 112.5; 112.9; 117.2; 118.1; 118.2; 118.3; 118.9; 119.1; 119.2; 119.3; 119.4; 119.5; 119.6; 119.9; 133.21.

Association of American Steel Manufacturers, J. O. Leech, secretary, 616 Investment Building, Pittsburgh, Pa. 600.1; 600.7; 602.2; 603.21; 603.23; 603.24; 604.10; 604.11; 604.13; 604.20; 605.11; 605.12; 605.13; 605.15; 605.25; 606.2; 621.32.

Association of American Wood Pulp Importers, G. W. Oliphant, president, 200 Fifth Avenue, New York, N. Y. 400.50.

Association of Edison Illuminating Companies, Preston S. Millar, secretary, Eightieth Street and East End Avenue, New York, N. Y. 600.3; 712.2; 713.5; 714.34; 714.38; 715.44; 716.30; 719.55.

Association of Electragists, International, Lawrence W. Davis, general manager, 420 Lexington Avenue, New York, N. Y. 710.; 714.22; 714.41; 715.11; 715.30; 715.41; 715.42.

Association of Iron and Steel Electrical Engineers, John F. Kelly, managing director, 1010 Empire Building, Pittsburgh, Pa. 611.53; 702.0; 711.20; 711.21; 711.22; 714.11; 714.12; 744.1; 766.2.

Association of Manufacturers of Chilled Car Wheels, G. E. Doke, president and secretary, McCormick Building, Chicago, Ill. 611.18.

Association of New York State Canners (Inc.), John P. Street, secretary, 1031 Lincoln-Alliance Building, Rochester, N. Y. 134.11; 134.21; 134.22; 134.42; 134.45.

Association of Official Agricultural Chemists, W. W. Skinner, secretary, post-office box 290, Pennsylvania Avenue Station, Washington, D. C. 010; 019.0; 021.1; 021.2; 021.5; 021.6; 021.7; 021.9; 022.1; 022.2; 022.3; 022.40; 040; 060; 093.7; 098.1; 099.1; 100; 104.0; 107.3; 108.0; 110; 117.0; 119.3; 119.5; 119.9; 120; 123.1; 126.7; 130; 142.0; 142.91; 142.94; 142.97; 151.0; 152.1; 152.2; 153.0; 154.0; 154.54; 154.6; 154.70; 155.0; 160.; 162.; 164.1; 165.0; 165.3; 171; 173; 175.1; 175.2; 175.3; 175.4; 175.5; 175.6; 175.7; 175.9; 176.0; 178.0; 179; 211.1; 212.; 216.; 217.; 221.; 222.; 231.; 594.; 801.4; 802.1; 802.2; 803.10; 803.25; 803.29; 810.; 811.; 813.9; 814.2; 815.2; 819.4; 819.9; 821.2; 821.7; 821.9; 824.; 832.4; 834.1; 834.2; 834.8; 834.9; 839.33; 839.36; 839.37; 839.7; 839.9; 840.5; 850.; 851.; 852.; 859.; 871.0; 881.0; 881.11; 881.12; 881.15; 881.19; 881.21; 881.22; 881.23; 881.24; 881.4; 881.9; 882.0; 882.3; 892.

Association of Official Seed Analysts of North America, F. S. Holmes, secretary, University of Maryland, College Park, Md. 240.

Association of Railway Electrical Engineers, J. A. Andreucetti, secretary, Chicago & North Western Terminal Station, Chicago, Ill. 505.17; 600.3; 710.; 711.12; 711.21; 711.22; 712.0; 714.11; 714.21; 714.22; 715.21; 715.30; 715.39; 715.44; 716.10; 716.2; 716.30; 716.39; 719.55; 767.

Automotive Electric Association, Earl Turner, manager, 1365 Ontario Street, Cleveland, Ohio. 711.12; 711.22; 712.2; 713.6; 715.30.

Calavo Growers of California, Miss Adeltha Peterson, assistant secretary, 4803 Everett Avenue, Los Angeles, Calif. 131.6.

California Canning Peach Growers, F. B. Schmidt, assistant secretary, 244 California Street, San Francisco, Calif. 132.44.

California Fruit Exchange, F. W. Read, manager, standardization department, California Fruit Building, Sacramento, Calif. 131.7; 132.13; 132.22; 132.41; 132.42; 132.44; 132.45; 132.46.

California Fruit Growers Exchange, F. O. Wallschlager, assistant secretary, Los Angeles, Calif. 131.22; 131.23; 131.25.

California Olive Association, H. Lindrose, 216 Pine Street, San Francisco, Calif. 131.4.

California Peach and Fig Growers Association, John G. Tyler, Droge Building, Fresno, Calif. 131.3; 133.44.

California Redwood Association, J. W. Williams, secretary, 405 Montgomery Street, San Francisco, Calif. 400.27; 401.29; 401.47; 402.2; 402.41; 402.42; 402.43; 402.51; 402.52; 411.1; 411.29; 411.3; 411.41; 411.42; 411.43; 411.5; 411.6; 411.7; 412.1; 413.0 413.1; 413.4; 413.6; 413.8; 423.5.

California Walnut Growers Association, Con G. Cowan, statistician, 1745 East Seventh Street, Los Angeles, Calif. 135.7.

California White and Sugar Pine Manufacturers Association. See Western Pine Association.

Canners League of California, Preston McKinney, vice president, 215 Market Street, San Francisco, Calif. 120.; 134.13; 134.22; 134.41; 134.42; 134.44; 134.45; 134.56.

Cast Stone Institute, C. G. Walker, assistant secretary, 33 West Grand Avenue, Chicago, Ill. 516.3; 516.4; 518.89.

Chlorine Institute, Robert T. Baldwin, secretary, 30 East Forty-second Street, New York, N. Y. 607.6.

Clay Products Institute of California, Norman W. Kelch, secretary-manager, Fifth and Figueroa Streets, Los Angeles, Calif. 534.23.

Commission on Standardization of Biological Stains, H. J. Conn, chairman, Agricultural Experiment Station, Geneva, N. Y. 803.19.

Common Brick Manufacturers' Association of America, Ralph P. Stoddard, secretary-manager, Guarantee Title Building, Cleveland, Ohio. 516.3; 518.50; 518.51; 518.53; 518.55; 518.56; 518.83.

Compressed Air Society, C. H. Rohrbach, secretary, 90 West Street, New York, N. Y. 615.9; 791.2.

Compressed Gas Manufacturers' Association (Inc.), Franklin R. Fetherston, secretary, 110 West Fortieth Street, New York, N. Y. 956.1.

Concrete Reinforcing Steel Institute, M. A. Beeman, secretary, Tribune Tower, Chicago, Ill. 516.3; 518.50; 605.25.

Consolidated Classification Committee, R. C. Fyfe, chairman, 404 Chicago Union Station, Chicago, Ill. 474.5; 479.2; 951.11; 951.12; 951.13; 951.31; 951.32; 951.33; 951.41; 951.42; 951.45; 951.61; 951.62; 951.63; 951.64; 951.65; 951.66; 951.71; 951.72; 951.73; 952.12; 942.14; 952.19; 952.2; 953.2; 953.30; 953.34; 953.36; 954.1; 954.30; 954.36; 955.1; 955.2; 955.4; 955.5; 957.19; 957.2; 959.1; 959.6.

Contracting Plasterers' International Association, Edward McDonnell, secretary-treasurer, 4755 Commonwealth Avenue, Detroit, Mich. 402.51; 514.63; 516.2; 605.24.

Cotton Textile Institute (Inc.), C. K. Everett, in charge, new uses section, 320 Broadway, New York, N. Y. 300.6.

Cover Paper Manufacturers Association, E. H. Naylor, secretary, 95 State Street, Springfield, Mass. 475.1; 475.2; 475.3.

Diesel Engine Manufacturers' Association, M. J. Reed, research engineer, 30 Church Street, New York, N. Y. 704.1.

Douglas Fir Plywood Institute, William L. Rawn, secretary, 520 Washington Building, Tacoma, Wash. 400.23; 413.52.

Eastern Clay Products Association, Henry T. Shelley, secretary-manager, Colonial Building, Philadelphia, Pa. 518.55; 531.5; 534.23; 534.29.

Electric Hoist Manufacturers Association, E. Donald Tolles, secretary, 165 Broadway, New York, N. Y. 744.2.

Electrochemical Society, Colin G. Fink, secretary, Columbia University, New York, N. Y. 712.1.

Envelope Manufacturers' Association of America, Charles R. Stevenson, secretary-treasurer, 19 West Forty-fourth Street, New York, N. Y. 478.19.

Felt Manufacturers Association, M. J. Morrison, secretary-treasurer, 17 Battery Place, New York, N. Y. 390.5.

Fire Protection Group of American Standards Association, 29 West Thirty-ninth Street, New York, N. Y. 202.41; 518. 50.

Florida Citrus Exchange, Tampa, Fla. 131.22; 131.25; 131.26.

Gas Products Association, Mary Redden, secretary, 250 East Ontario Street, Chicago, Ill. 767.

Glass Container Association of America, Victor L. Hall, secretary of the standardization committee, 19 West Forty-fourth Street, New York, N. Y. 615.82; 955.0.

Grinding Wheel Manufacturers Association of the United States and Canada, Frank R. Henry, secretary, Dayton, Ohio. 541.0; 541.3.

Gypsum Association, H. J. Schweim, secretary, 211 West Wacker Drive, Chicago, Ill. 514.3; 514.61; 514.62; 516.3; 518.53.

Hardwood Interior Trim Manufacturers Association, L. A. Rhodes, assistant secretary, 63 South Third Street, Memphis, Tenn. 411.42; 413.8.

Heating and Piping Contractors National Association, Joseph C. Fitts, secretary, 50 Union Square East, New York, N. Y. 607.14; 607.2; 607.3; 607.4; 607.6; 614.4.

Hydraulic Society, C. H. Rohrbach, secretary, 90 West Street, New York, N. Y. 755.0.

Illuminating Engineering Society, E. H. Hobbie, general secretary, 29 West Thirty-ninth Street, New York, N. Y. 716.0; 716.12; 716.30.

Indiana Limestone Institute, H. S. Brightly, director, architect's service bureau, Bedford, Ind. 511.2.

Industrial Unit Heater Association, E. B. Cresap, secretary, 308 West Washington Street, Chicago, Ill. 792.1.

Institute of American Meat Packers, W. W. Woods, president, 506 South Wabash Avenue, Chicago, Ill. 012.5; 018.0; 018.13; 018.20; 043.0; 302.36; 302.39; 304.3; 304.6; 331.22; 341.2; 477.6; 477.9; 729.3; 745.1; 951.13; 951.22; 951.24; 951.32; 951.64; 953.36; 954.1; 954.36; 959.1; 981.1; 981.4; 981.63; 982.2; 982.3; 982.9.

Institute of Boiler and Radiator Manufacturers, F. W. Herendeen, secretary, Geneva, N. Y. 614.4.

Institute of Makers of Explosives, C. Stewart Comeaux, secretary, 103 Park Avenue, New York, N. Y. 862.

Institute of Radio Engineers, Harold P. Westman, secretary, 33 West Thirty-ninth Street, New York, N. Y. 718.60; 718.61; 718.62; 718.63; 718.69.

Insulated Power Cable Engineers Association, R. J. Wiseman, secretary, care of the Okonite Co., Passaic, N. J. 715.36; 715.41; 719.56.

Intercollegiate Association of Amateur Athletes of America. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 429.9; 943.94.

International Acetylene Association, A. C. Morrison, secretary-treasurer, 30 East Forty-second Street, New York, N. Y. 767.

International Association of Electrotypers of America, Fred W. Gage, chairman standardization committee, care of Gage Printing Co. (Ltd.), Battle Creek, Mich. 651.6; 651.9; 788.

International Association of Ice Cream Manufacturers, Fred Rasmussen, executive secretary, Telegraph Building, Harrisburg, Pa. 959.1.

International Association of Industrial Accident Boards and Commissions, Ethlebert Stewart, secretary, United States Bureau of Labor Statistics, Washington, D. C. 541.3; 766.0; 783.; 784.0.

International Association of Milk Dealers, R. E. Little, executive secretary, 228 North La Salle Street, Chicago, Ill. 646.51; 731.; 919.8; 959.1.

International Association of Municipal Electricians, W. H. Harth, secretary, City Hall, Columbia, S. C. 715.41; 715.43; 715.44.

International Lawn Tennis Federation. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 317.7; 943.1.

International Society of Master Painters and Decorators (Inc.), E. J. Bush, secretary-treasurer, 127 North Jefferson Avenue, Peoria, Ill. 840.4.

Joint Basketball Rules Committee. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 069.1; 943.97.

Joint Concrete Culvert Pipe Committee, M. W. Loving, secretary, 33 West Grand Avenue, Chicago, Ill. 516.9; 518.61.

Kraft Institute, O. M. Porter, secretary, 122 East Forty-second Street, New York, N. Y. 957.2.

Laundryowners National Association of the United States and Canada, W. E. Fitch, general manager, Joliet, Ill. 787.; 803.11; 834.4; 871.21; 871.25; 891.

Linoleum and Felt Base Manufacturers Assn., Stevenson, Jordan, and Harrison, business managers, 19 West Forty-fourth Street, New York, N. Y. 391.

Lumbermen's Club of Memphis, H. B. Phillips, secretary, Memphis, Tenn. 401.9.

Machinery Builders Society, W. C. Fulmer, secretary, 50 Church Street, New York, N. Y. 429.9; 706.1; 725.42.

Malleable Iron Research Institute, Robert E. Belt, secretary, Union Trust Building, Cleveland, Ohio. 611.21.

Manganese Track Society, W. Homer Hartz, chairman, care of Morden Frog and Crossing Works, Chicago, Ill. 606.3; 606.4; 622.5; 718.41.

Manufacturers Standardization Society of the Valve and Fittings Industry, Albert C. Taylor, general secretary, 103 Park Avenue, New York, N. Y. 607.14; 607.2; 607.4.

Manufacturing Chemists' Association of the United States, Warren N. Watson, secretary, 1121 Woodward Building, Fifteenth and H Streets, NW., Washington, D.C. 532.21; 821.3; 821.5; 821.7; 831.1; 839.38; 918.1; 918.2; 918.87; 918.9; 919.82; 955.1.

Maple Flooring Manufacturers Association, E. C. Singler, secretary, 332 South Michigan Avenue, Chicago, Ill. 411.25; 411.29; 518.56.

Michigan Canners Association, C. A. Ray, secretary, New Era, Mich. 134.11; 134.42; 134.44; 134.45.

Millwork Institute of California, Lester G. Sterett, secretary, administrative headquarters, 523 T. W. Patterson Building, Fresno, Calif. 423.0; 423.1; 423.2; 423.3; 423.9.

Mine Inspectors Institute of America, C. A. McDowell, secretary, post-office box 64, Pittsburgh, Pa. 860.

Mountain States Honey Producers Association, Cecile Forrest, secretary, Boise, Idaho. 162.

National Association of Dyers and Cleaners of the United States and Canada, Walter H. Franks, acting manager, Silver Spring, Md. 093.7; 093.9; 103.3; 143.1; 217; 300.4; 365.0; 370; 390.6; 397.0; 503.2; 803.10; 831.9; 839.9; 843.5; 846.5; 849.4; 849.6; 849.9; 871.24; 871.7; 882.2; 891; 933.

National Association of Fan Manufacturers, E. B. Cresap, secretary, 308 West Washington Street, Chicago, Ill. 791.1.

National Association of Farm Equipment Manufacturers, H. J. Sameit, secretary, 608 South Dearborn Street, Chicago, Ill. 413.54; 732.

National Association of Finishers of Cotton Fabrics, George L. Sawyer, secretary, 40 Worth Street, New York, N. Y. 300.4.

National Association of Glue Manufacturers (Inc.), H. B. Sweatt, secretary-treasurer, 55 West Forty-second Street, New York, N. Y. 093.0.

National Association of Hosiery and Underwear Manufacturers, L. R. Keeffe, acting secretary, 468 Fourth Avenue, New York, N. Y. 302.10; 309.2; 397.0; 953.2.

National Association of Marble Dealers, Victor Mosel, secretary, 721 Rockefeller Building, Cleveland, Ohio. 511.3; 518.59.

National Association of Master Plumbers of the United States, Jere L. Murphy, chairman, standardization committee, 340 East Forty-fourth Street, New York, N.Y. 600.6.

National Association of Musical Merchandise Manufacturers, Henry C. Lomb, president, 45 West Forty-fifth Street, New York, N. Y. 929.

National Association of Mutual Casualty Companies, J. M. Eaton, secretary, 230 North Michigan Avenue, Chicago, Ill. 787.

National Association of Railroad Tie Producers, Roy M. Edmonds, secretary, 1252 Syndicate Trust Building, St. Louis, Mo. 401.11; 401.12; 401.13; 401.14; 401.15; 401.16; 401.17; 401.18.

National Association of Sheet Metal Contractors of the United States, W. C. Markle, secretary, 429 Fourth Avenue, Pittsburgh, Pa. 518.5; 605.22; 614.4; 619.2; 791.0; 792.1; 792.2; 840.1; 849.9.

National Association of Waste Material Dealers, Charles M. Haskins, secretary, Times Building, New York, N. Y. 201.2; 390.5; 400.50; 470.1; 600.2.

National Association of Wooden Box Manufacturers, R. H. Morehouse, secretary, 111 West Washington Street, Chicago, Ill. 953.30; 953.31; 953.33; 953.35; 953.36; 953.37; 954.30; 954.31; 954.32; 954.33; 959.9.

National Association of Wool Manufacturers, Walter Humphreys, secretary-treasurer, 80 Federal Street, Boston, Mass. 361.1.

National Battery Manufacturers Association, C. M. Angell, chairman technical committee, care of Vesta Battery Corporation, 6501 West Sixty-fifth Street, Chicago, Ill. 712.2.

National Board of Fire Underwriters, W. E. Mallalieu, general manager, 85 John Street, New York, N. Y. 516.3; 518.42; 518.50; 518.51; 518.54; 518.55; 518.59; 518.71; 518.82; 518.83; 518.9; 532.22; 534.10; 600.3; 605.22; 605.23; 607.0; 607.6; 611.19; 613.9; 614.0; 614.9; 703.9; 704.0; 705.0; 711.10; 711.20; 713.1; 713.5; 714.12; 714.21; 714.22; 714.41; 714.42; 714.51; 714.52; 715.12; 715.21; 715.23; 715.30; 715.41; 715.42; 715.44; 715.50; 716.11; 716.15; 716.16; 716.31; 716.32; 717.0; 717.3; 718.0; 718.30; 718.32; 718.61; 719.55; 721.1; 722.2; 744.1; 744.2; 745.3; 756.; 767.; 785.1; 787.; 789.; 791.0; 792.0; 840.2; 912.; 915.30; 923.; 956.2; 970.; 973.4; 973.5; 974.0; 974.2; 976.; 997.2; 997.4; 997.5.

National Building Granite Quarries Association (Inc.), H. H. Sherman, secretary, 31 State Street, Boston, Mass. 511.1; 518.51.

National Bureau of Casualty and Surety Underwriters, Albert W. Whitney, associate general manager, 1 Park Avenue, New York, N. Y. 766.0; 784.0.

National Canners Association, Frank E. Gorrell, secretary, 1739 H Street, NW., Washington, D. C. 953.2; 953.37; 959.1.

National Collegiate Athletic Association. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York., N. Y.) 068.1; 069.1; 209.91; 209.92; 429.9; 943.1; 943.4; 943.94; 943.96.

National Conference on Street and Highway Safety, A. W. Koehler, secretary, 1615 H Street NW., Washington, D. C. 718.5; 722.0; 998.

National Conference on Weights and Measures, F. S. Holbrook, secretary, National Bureau of Standards, Washington, D. C. 390.4; 793.1; 793.5; 793.6; 793.7; 918.2; 919.1; 952.11; 953.32; 955.1; 956.2.

National Cottonseed Products Association (Inc.), Earl S. Haines, executive secretary, 2610 Sterick Building, Memphis, Tenn. 112.0; 112.2; 112.3; 135.5; 141.; 142.0; 142.1; 142.4; 142.6; 143.2; 301.3; 503.1; 871.0; 919.82.

National Crushed Stone Association (Inc.), A. T. Goldbeck, director, bureau of engineering, 1735 Fourteenth Street NW., Washington, D. C. 751.

National Die and Special Tool Builders Association, George R. Tuthill, secretary, 40 North Wells Street, Chicago, Ill. 765.

National District Heating Association, D. L. Gaskill, executive secretary, 603 South Broadway, Greenville, Ohio. 614.4.

National Door Manufacturers Association, H. L. Stillwell, secretary, 19 South La Salle Street, Chicago, Ill. 423.1; 423.2; 423.3.

National Electric Light Association, Paul S. Clapp, managing director, 420 Lexington Avenue, New York, N. Y. 069.3; 311.8; 401.31; 401.32; 401.36; 401.37; 402.1; 427.; 429.7; 503.4; 504.22; 518.9; 526.1; 532.22; 600.3; 603.42; 605.11; 607.5; 608.13; 608.2; 608.30; 608.31; 608.6; 611.21; 615.82; 642.13; 693.1; 703.0; 710.; 711.20; 713.5; 714.34; 714.50; 715.11; 715.12; 715.30; 715.44; 716.30; 719.55; 719.61; 719.62; 801.3; 844.3; 844.4.

National Electrical Manufacturers' Association, A. W. Berresford, managing director, 420, Lexington Avenue, New York, N. Y. 429.7; 431.9; 504.8; 532.22; 600.3; 605.22; 611.18; 611.53; 710.; 711.11; 711.12; 711.20; 711.21; 711.22; 711.24; 711.25; 712.1; 712.2;

713.1; 713.2; 713.4; 713.5; 714.11; 714.12; 714.21; 714.22; 714.41; 714.42; 714.50; 714.51; 714.52; 715.11; 715.12; 715.13; 715.21; 715.22; 715.34; 715.35; 715.40; 715.41; 715.42; 715.44; 716.10; 716.14; 718.60; 718.61; 718.62; 718.63; 718.64; 718.69; 719.52; 719.55; 719.58; 719.63; 721.1; 767.

National Engineering Inspection Association, Burton H. Witherspoon, secretary, Pittsburgh Testing Laboratory, Pittsburgh, Pa. 400.14; 516.0; 600.1.

National Fire Protection Association, Franklin H. Wentworth, managing director, 60 Batterymarch Street, Boston, Mass. 518.51; 518.59; 600.3; 605.22; 605.23; 607.0; 715.44; 715.50; 719.55; 722.1; 722.2; 725.42; 789.; 956.2; 970.; 973.1; 974.0.

National Founders Association, J. M. Taylor, secretary, 29 South La Salle Street, Chicago, Ill. 768.

National Furniture Warehousemen's Association, R. J. Wood, secretary, 4651 Cottage Grove Avenue, Chicago, Ill. 954.36.

National Hair and Jute Felt Manufacturers Association, A. B. Forsberg, managing director, 10 South La Salle Street, Chicago, Ill. 365.98.

National Hardwood Lumber Association, L. S. Beale, secretary, 2408 Buckingham Building, Chicago, Ill. 400.21; 400.22; 400.31; 400.32; 400.33; 400.34; 400.35; 400.36; 400.37; 400.38; 400.39; 401.10; 401.49; 402.41; 402.42; 402.43; 402.51; 402.9; 411.43; 412.1; 412.2; 412.9; 413.1; 413.23; 413.4; 413.52; 413.53; 413.54.

National Hay Association (Inc.), Fred K. Sale, secretary, 600 Board of Trade, Indianapolis, Ind. 111.1; 111.2; 111.3; 111.4; 111.5; 111.6; 111.91; 111.92; 111.93; 111.94; 111.95; 111.96; 111.97; 111.98; 111.99; 113.1; 113.2; 113.3.

National Hockey League. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 209.92; 429.9; 943.96.

National Horseshoe Pitchers Association of America. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 943.5.

National Indoor Baseball Association of the United States. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 429.9; 943.1.

National Jewelers Board of Trade, B. L. Shinn, secretary, 22 West Forty-eighth Street, New York, N. Y. 560.; 561.

National Kraut Packers Association, Roy Irons, secretary, Clyde, Ohio. 125.1.

National League of Professional Baseball Clubs. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 068.1; 429.9; 943.1; 943.4.

National Lime Association, Norman G. Hough, president and general manager, 927 Fifteenth Street NW., Washington, D. C. 514.4; 516.2; 518.38; 843.5.

National Luggage Dealers Association, A. B. Sheldon, 45 Genessee Street, Utica, N. Y. 958.3.

National Machine Tool Builders' Association, E. F. DuBrul, general manager, 617 Vine Street, Cincinnati, Ohio. 608.31; 611.16; 611.52; 711.20; 760.; 765.

National Metal Exchange (Inc.), J. J. Murphy, assistant secretary, 27 William Street, New York, N. Y. 641.11; 681.1; 691.1.

National Paper Box Manufacturers Association, Howard P. Beckett, commissioner, Liberty Trust Building, Philadelphia, Pa. 953.2.

National Paper Trade Association of the United States, A. H. Chamberlain, executive secretary, 420 Lexington Avenue, New York, N. Y. 476.31; 476.32; 476.4; 476.9.

National Peanut Products Association, Fred W. Weeks, secretary, 664 North Wells Street, Chicago, Ill. 135.5.

National Pecan Association, J. Lloyd Abbott, secretary, Route 1, Spring Hill, Ala. 135.6.

National Pecan Growers Exchange, H. B. Taylor, secretary, Albany, Ga. 135.6.

National Pickle Packers Association, Joseph E. Mitchell, secretary, 208 South La Salle Street, Chicago, Ill. 129.11; 951.13; 951.44.

National Preservers Association (Inc.), Daniel R. Forbes, counsel and executive secretary, 839 Seventeenth Street NW., Washington, D. C. 134.42; 134.51–134.53; 134.55.

National Recreation Association, formerly Playground and Recreation Association of America. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 429.9; 943.1.

National Research Council, committee on heat transmission, 40 West Fortieth Street, New York. 792.0.

National Safety Council, W. H. Cameron, managing director, 20 North Wacker Drive, Chicago, Ill. 429.4; 607.0; 703.9; 718.5; 722.32; 760.; 782.; 783.; 993.

National Sand and Gravel Association, V. P. Ahearn, executive secretary, Munsey Building, Washington, D. C. 512.11; 512.12; 740.

National Scale Men's Association, C. L. Richard, secretary-treasurer, National Bureau of Standards, Clearing Station, Chicago, Ill. 793.5.

National School Supply Association, J. W. McClinton, executive secretary, 176 West Adams Street, Chicago, Ill. 871.12; 871.26; 881.5.

National Slag Association, H. J. Love, manager, 937 Leader Building, Cleveland, Ohio. 512.2.

National Slate Association, W. S. Hays, secretary, Drexel Building, Philadelphia, Pa. 518.56; 518.57.

National Soybean Oil Manufacturers Association, W. H. Eastman, president, Box 603, Milwaukee, Wis. 143.2.

National Tent and Awning Manufacturers Association, J. E. Dilg, president, 116 South Fourth Street, St. Louis, Mo. 300.6.

National Terra Cotta Society, W. F. Lockhardt, secretary-director, 230 Park Avenue, New York, N. Y. 518.51; 534.24.

National Warm Air Heating Association, Allen W. Williams, managing director, 3440 A. I. U. Building, Columbus, Ohio. 614.4.

National Watch Case Manufacturers Association, Alexander Vincent, secretary, 20 West Forty-seventh Street, New York, N. Y. 672.

National Wholesale Druggists' Association (Inc.), E. L. Newcomb, secretary, 51 Maiden Lane, New York, N. Y. 489.

Natural Gasoline Association of America, Ray E. Miller, secretary, 819 Wright Building, Tulsa, Okla. 503.3.

New England Cotton Buyers Association, W. R. Sparrel, secretary, 30 Kilby Street, Boston, Mass. 300.1.

New England Milk Producers' Association, Wendell P. Davis, secretary, 51 Cornhill Street, Boston, Mass. 021.0.

New York Produce Exchange, William C. Rossman, secretary, 2 Broadway, New York, N. Y. 011.95; 012.3; 012.4; 012.92; 012.94; 043.2; 102.1; 111.4; 111.5; 111.6; 113.1; 113.2; 113.3; 142.1; 142.3; 142.4; 142.5; 142.6; 142.8; 142.92; 143.2; 502.1; 502.2; 503.0; 503.4; 504.54; 848.2; 848.4; 951.13; 951.24.

News Print Service Bureau, H. S. Kellogg, secretary, 342 Madison Avenue, New York, N. Y. 475.5.

North Carolina Pine Association. *See* Southern Pine Association.

Northern Hemlock and Hardwood Manufacturers' Association, O. T. Swan, secretary-manager, Oshkosh, Wis. 400.24; 400.25; 402.41; 402.42; 402.43; 402.51; 411.1; 411.24; 411.29; 411.3; 411.41; 411.43; 411.5; 411.6; 412.1.

Northern Nut Growers Association (Inc.), Henry D. Spencer, secretary, 275 East Decatur Street, Decatur, Ill. 135.2; 135.7; 135.9.

Northern White Cedar Association, Norman E. Boucher, secretary, 702 Lumber Exchange, Minneapolis, Minn. 401.11; 401.21; 401.31; 402.52.

Northwest Canners Association, E. M. Burns, secretary, 909 Board of Trade Building, Portland, Oreg. 126.11; 127.1; 127.2; 132.11; 132.22; 132.42; 132.45; 134.11; 134.21; 134.22; 134.42; 134.45.

Oak Flooring Manufacturers' Association of the United States, W. L. Claffey, secretary, 1812 Sterick Building, Memphis, Tenn. 411.26.

Optical Society of America, L. B. Tuckerman, secretary, Bureau of Standards, Washington, D. C. 914.0.

Outdoor Advertising Association of America (Inc.), Joseph Harris, secretary, 165 West Wacker Drive, Chicago, Ill. 998.

Pacific Lumber Inspection Bureau (Inc.), F. W. Alexander, secretary, 726 Henry Building, Seattle, Wash. 400.20; 400.21; 400.23; 400.24; 400.28; 401.14; 402.42; 402.43; 402.51; 402.9; 411.1; 411.23; 411.3; 411.5; 411.8; 411.9; 412.1; 413.1; 413.4; 413.8; 413.9; 423.5.

Pacific States Butter, Egg, Cheese, and Poultry Association, B. F. McKibben, secretary, 26 Front Street, San Francisco, Calif. 022.1; 953.36.

Paperboard Industries Association, G. R. Browder, general manager, 608 South Dearborn Street, Chicago, Ill. 472.0; 472.93; 953.2.

Pennsylvania Slate Institute, R. S. Tibbals, secretary, Pen Argyl, Pa. 511.52.

Phillipine Islands Government, Department of Agriculture and National Resources, Manila, P. I. 330.

Plate Glass Manufacturers of America, P. A. Hughes, secretary, First National Bank Building, Pittsburgh, Pa. 521.1.

Plumbago Crucible Association, C. H. Rohrbach, secretary, 90 West Street, New York, N. Y. 574.

Plywood Manufacturers Association, Alexander D. King, acting commissioner, 178 West Adams Street, Chicago, Ill. 413.52.

Portland Cement Association, W. M. Kinney, general manager, 33 West Grand Avenue, Chicago, Ill. 516.2; 516.3; 516.4; 516.5; 516.9; 518.51; 518.56; 518.73; 518.9.

Power Piping Society, Stuart J. Swensson, secretary, 1714 Clark Building, Pittsburgh, Pa., 607.0; 607.6.

Pyroxylin Plastics Mfrs. Assn., John E. Walker, secretary, 1001 Fifteenth Street NW., Washington, D. C. 846.5.

Radio Manufacturers Association (Inc.), M. F. Flanagan, executive secretary, 32 West Randolph Street, Chicago, Ill. 712.1; 712.2; 713.1; 713.5; 713.6; 714.12; 715.35; 715.41; 716.14; 718.61; 718.64; 718.66; 718.69.

Rag Content Paper Manufacturers, E. H. Naylor, secretary, Box 245, Springfield, Mass. 470.1.

Railway Accounting Officers Association, E. R. Woodson, secretary, 1124 Woodward Building, Washington, D. C. 489.

Railway Fire Protection Association, R. R. Hackett, secretary, Baltimore & Ohio Building, Baltimore, Md. 400.49; 518.51; 605.22; 614.0; 701.3; 715.30; 721.2; 726.1; 767.

Red Cedar Shingle Bureau, Arthur Bevan, secretary, 4455 Stuart Building, Seattle, Wash. 402.52.

Refrigerating Machinery Association, Fred Nolde, secretary, 23 South Fifty-second Street, Philadelphia, Pa. 607.14; 607.6; 785.1.

Rice Millers' Association, R. L. Weber, secretary-treasurer, post office box 1289, New Orleans, La. 105.1.

Silk Association of America (Inc.), Ramsay Peugnet, secretary, 468 Fourth Avenue, New York, N. Y. 371.; 372.0; 373.20; 373.29.

Simplex Concrete Pile Association (Inc.), Archibald L. Jackson, secretary, 149 Broadway, New York, N. Y. 518.42.

Society of Automotive Engineers (Inc.), John A. C. Warner, secretary and general manager, 29 West Thirty-ninth Street, New York, N. Y. 066.7; 202.43; 205.1; 206.1; 206.2; 206.4;

206.5; 207.3; 209.7; 314.1; 365.98; 503.0; 504.22; 504.34; 504.49; 518.51; 521.1; 525.4; 541.3; 600.1; 600.3; 600.5; 603.21: 603.22; 603.24; 603.27; 603.33; 603.42; 603.43; 604.22; 606.4; 607.0; 607.14; 607.4; 607.6; 607.7; 608.0; 608.2; 608.31; 608.32; 608.4; 608.51; 608.52; 608.6; 608.7; 611.21; 611.41; 611.54; 611.55; 615.42; 617.12; 621.31; 621.33; 621.34; 621.35; 622.1; 631.11; 631.22; 631.23; 631.24; 631.33; 631.41; 640.1; 641.21; 642.24; 644.21; 644.23; 645.11; 645.12; 645.21; 645.22; 645.24; 645.39; 645.4; 645.9; 646.41; 646.52; 647.12; 647.13; 647.14; 647.15; 647.16; 647.17; 647.21; 647.34; 647.36; 647.38; 654.51; 692.1; 692.2; 693.1; 693.2; 704.0; 705.0; 705.3; 705.5; 705.6; 710.; 711.12; 711.22; 711.42; 712.2; 712.3; 712.9; 714.21; 714.22; 714.37; 714.51; 715.11; 715.13; 715.21; 715.34; 715.41; 715.44; 716.12; 719.3; 719.4; 719.51; 719.72; 721.2; 722.0; 722.1; 722.31; 722.32; 722.33; 722.34; 722.35; 722.36; 722.37; 722.38; 722.39; 723.0; 724.1; 724.21; 724.22; 724.23; 724.24; 724.25; 724.26; 724.27; 724.3; 724.4; 725.2; 725.3; 729.5; 765.; 766.1; 766.2; 794.; 919.80.

Society for Electrical Development (Inc.), J. Smieton, jr., secretary, 420 Lexington Avenue, New York, N. Y. 715.30; 716.30.

Society of Motion Picture Engineers, Arthur C. Hardy, chairman, standards committee, 33 West Forty-second Street, New York, N. Y. 911.1; 911.2; 912.

Society for the Promotion of Engineering Education, F. L. Bishop, secretary, University of Pittsburgh, Pittsburgh, Pa. 700.; 706.0; 716.0; 716.30; 719.63; 724.0; 755.0; 910.

Southeastern Railroads, E. H. Dulaney, agent, 101 Marietta Street, Atlanta, Ga. 951.13; 952.12; 952.14; 952.2; 953.2; 953.31; 954.31; 954.33; 954.35.

Southern Cypress Manufacturers' Association, J. R. Black, secretary-manager, Jacksonville, Fla. 400.22; 401.13; 402.42; 402.43; 402.52; 411.1; 411.22; 411.3; 411.41; 411.42; 411.43; 411.5; 411.7; 412.1; 413.0; 413.1; 413.29; 413.4; 413.8; 413.9; 423.5.

Southern Pine Association, H. C. Berckes, secretary-manager, New Orleans, La. 400.26; 402.41; 402.42; 402.43; 402.51; 402.52; 411.1; 411.27; 411.3; 411.41; 411.42; 411.43; 411.5; 411.6; 411.7; 411.9; 412.0; 412.1; 412.9; 413.24; 413.4; 413.54; 423.5.

Southern Sash, Door, and Millwork Manufacturers Association, C. B. Harman, secretary, Forsythe Building, Atlanta, Ga. 423.1; 423.2; 423.3; 423.9.

Standard Container Manufacturers, Russell W. Bennett, secretary-manager, Realty Building, Jacksonville, Fla. 951.13; 952.11; 952.12; 952.14; 952.2; 953.2; 953.31; 954.31; 954.33; 954.35.

Steel Barrel Manufacturers Institute, D. S. Hunter, secretary-treasurer, Keith Building, Cleveland, Ohio. 951.12; 951.32.

Steel Founders Society of America, Granville P. Rogers, managing director, 420 Lexington Avenue, New York, N. Y. 429.9.

Steel Joist Institute, Frank Burton, Dime Bank Building, Detroit, Mich. 605.22.

Structural Clay Tile Association, Edward C. Kerth, secretary, 205 West Wacker Drive, Chicago, Ill. 518.50.

Tanners Council of America, J. L. Nelson, secretary, 41 Park Row, New York, N. Y. 063.6; 066.7.

Technical Association of the Pulp and Paper Industry, R. G. Macdonald, secretary, 18 East Forty-first Street, New York, N. Y. 400.50; 470.3.

Telephone Group of the American Standards Association, H. L. Huber, secretary, American Telephone & Telegraph Co., 195 Broadway, New York, N. Y. 401.30; 401.31; 401.32; 401.36.

Textile Color Card Association of the United States (Inc.), Margaret Hayden Rorke, secretary and managing director, 200 Madison Avenue, New York, N. Y. 306.0; 309.2; 365.0; 370.; 397.0.

Textile Converters Association, Walter B. Levett, secretary, 291 Broadway, New York, N. Y. 304.1.

Tire and Rim Association (Inc.), C. E. Bonnett, general manager, 1401 Guarantee Title Building, Cleveland, Ohio. 206.1; 206.2; 206.3; 206.4; 206.5; 722.36; 724.23; 725.2.

Tissue Paper Manufacturers Association, Herbert Thwaite, general manager, 280 Madison Avenue, New York, N. Y. 476.31; 476.32; 476.4; 476.9.

Underwriters' Laboratories, Dana Pierce, president, 207 East Ohio Street, Chicago, Ill. 069.3; 202.21; 202.32; 202.41; 365.98; 427.; 503.4; 505.13; 505.16; 516.4; 518.54; 532.22; 600.3; 605.22; 605.23; 607.6; 608.11; 613.5; 614.2; 614.3; 614.9; 645.9; 654.59; 704.1; 705.0; 705.4; 711.12; 711.25; 713.5; 714.11; 714.12; 714.21; 714.22; 714.41; 714.42; 714.51; 714.52; 715.11; 715.12; 715.13; 715.22; 715.34; 715.41; 715.42; 715.44; 715.50; 716.16; 716.31; 716.32; 716.39; 717.1; 718.31; 718.33; 718.64; 718.7; 719.72; 767.; 793.2; 793.6; 839.42; 839.43; 956.2; 959.1; 973.2; 997.4; 997.5.

United Roofing Contractors Association of North America, E. M. Pope, secretary, 58 West Washington Street, Chicago, Ill. 505.36.

United States Field Hockey Association. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 429.9; 943.1.

United States Golf Association. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 209.91; 943.93.

United States Government. (*See* end of list.)

United States Intercollegiate Lacrosse Association. (For rules of this organization communicate with American Sports Publishing Co., 45 Rose Street, New York, N. Y.) 209.91; 943.95.

United States Pharmacopœial Convention, Lewis E. Warren, secretary, 2 Raymond Street, Chevy Chase, Md. 042.2; 043.1; 043.2; 045.; 046.; 093. 7; 103.3; 119.4; 161.1; 161. 4; 161.7; 162.; 164.2; 171.; 204.12; 211.1; 211.3; 211.4; 212.; 214.; 216.; 217.; 221.; 222.; 223.; 398.1; 501.6; 504.53; 504.54; 504.6; 517.2; 546.; 593.; 801.1; 801.3; 801.4; 802.1; 802.2; 803.19; 803.21; 803.23; 803.24; 803.29; 803.31; 810.; 811.; 812.; 813.1; 813.2; 813.3; 813.4; 813.5; 813.6; 813.8; 813.9; 814.1; 814.2; 815.1; 815.2; 819.1; 819.3; 819.4; 819.9; 821.1; 821.2; 821.3; 821.5; 821.6; 821.7; 821.9; 822.1; 822.3; 822.4; 822.9; 823.; 824.; 831.1; 831.3; 831.4; 831.5; 831.7; 831.9; 832.2; 832.3; 832.4; 833.2; 833.3; 833.5; 833.9; 834.1; 834.3; 834.4; 834.5; 834.8; 834.9; 835.2; 835.4; 835.5; 835.9; 836.3; 836.9; 837.2; 837.9; 838.2; 839.1; 839.31; 839.32; 839.33; 839.34; 839.35; 839.36; 839.37; 839.38; 839.39; 839.43; 839.45; 839.6; 839.7; 839.9; 862.; 871.11; 871.3; 872.1; 882.4; 918.9.

United States Shellac Importers Association (Inc.), L. W. Babbage, secretary, 17 State Street, New York, N. Y. 846.11; 846.62.

Wallpaper Association of the United States, E. D. Belknap, executive vice president, 10 East Fortieth Street, New York, N. Y. 475.4.

Webbing Manufacturers' Exchange, Wilwyn Herbert, secretary, 74 Trinity Place, New York, N. Y. 394.5.

West Coast Lumbermen's Association, W. B. Greeley, secretary-manager, Stuart Building, Seattle, Wash. 400.21; 400.23; 400.24; 400.28; 401.14; 401.34; 402.1; 402.42; 402.43; 402.51; 402.9; 411.1; 411.21; 411.23; 411.24; 411.28; 411.3; 411.41; 411.42; 411.43; 411.5; 411.6; 411.9; 412.1; 413.1; 413.21; 413.26; 413.4; 413.54; 413.6; 413.8; 413.9; 423.1; 423.2; 423.3; 423.5; 423.9; 429.9.

Western Pine Association, S. V. Fullaway, jr., secretary, 510 Yeon Building, Portland, Oreg. 400.21; 400.23; 400.25; 400.26; 400.28; 402.41; 402.42; 402.43; 402.51; 411.1; 411.21; 411.23; 411.27; 411.28; 411.29; 411.3; 411.41; 411.42; 411.43; 411.5; 411.6; 411.7; 412.1; 413.0; 413.1; 413.21; 413.29; 413.8; 413.9; 421.4.

Western Red Cedar Association, W. H. Jones, secretary, 344 Peyton Building, Spokane, Wash. 400.43; 401.21; 401.31; 401.41.

White Pine Association of the Tonawandas, Henry Adams, secretary, North Tonawanda, N. Y. 400.26; 411.1; 411.42; 411.43; 411.8; 413.53; 413.6; 413.8; 413.9.

Writing Paper Manufacturers Association, E. H. Naylor, secretary-treasurer, 95 State Street, Springfield, Mass. 478.11; 478.12; 478.13; 478.14; 478.19.

UNITED STATES GOVERNMENT, WASHINGTON, D. C.

Congress:

Statutes: 007.0; 010.; 016.0; 021.0; 022.0; 022.3; 040.; 100.; 111.0; 120.; 142.91; 260.; 300.0; 604.0; 691.0; 701.3; 721.1; 726.1; 810.; 812.; 822.; 881.0;; 881.11; 881.15; 951.10; 952.10; 952.11.

Joint Committee on Printing. 470.3; 471.1; 472.15; 472.16; 472.19; 472.31; 472.32; 472.36; 472.38; 474.11; 474.2; 474.3; 474.5; 475.1; 475.3; 475.5; 475.6; 475.72; 475.74; 476.25; 476.9; 477.2; 477.3; 477.4; 477.5; 477.7; 478.11; 478.13; 478.16: 478.19; 478.22; 478.31; 478.33; 479.2; 479.4.

Executive Departments:

Department of Agriculture—

(A. S. A. sponsor.) 534.21; 703.9; 789.

Bureau of Agricultural Economics. 001.2; 002.; 003.; 007.0; 007.1; 007.2; 007.3; 007.4; 010.; 011.1; 011.8; 011.91; 014.1; 014.3; 015.0; 015.1; 015.3; 015.5; 019.0; 019.1; 022.0; 022.1; 022.2; 022.41; 051.; 052.; 053.; 100.; 101.1; 103.1; 103.5; 104.1; 105.1; 106.1; 107.1; 111.0; 111.1; 111.4; 111.5; 111.6; 111.91; 111.93; 111.99; 120.; 121.1; 121.2; 121.3; 121.4; 121.5; 121.7; 121.9; 122.11; 122.13; 122.14; 122.2; 122.3; 122.4; 122.5; 122.7; 123.1; 123.2; 123.3; 123.4; 123.51; 123.52; 123.6; 123.8; 124.1; 124.2; 124.3; 124.5; 125.1; 125.5; 125.9; 126.11; 126.13; 126.2; 126.6; 126.7; 127.1; 131.20; 131.22; 131.25; 131.5; 132.11; 132.13; 132.21; 132.22; 132.3; 132.41; 132.42; 132.44; 132.45; 133.13; 135.5; 135.6; 162.; 259.; 260.; 261.; 294.; 300.0; 300.1; 301.3; 360.; 952.10; 952.11; 953.30.

Bureau of Animal Industry. 001.1; 010.; 016.0; 018.20; 043.0; 812.

Bureau of Chemistry and Soils. 594.

Bureau of Public Roads. 401.29; 401.49; 402.2; 412.2; 505.0; 511.72; 518.11; 518.12; 518.13; 518.22; 518.24; 518.28; 518.29; 518.32; 518.33; 518.41; 518.42; 518.61; 518.81; 518.82; 603.42; 607.5; 729.4; 846.21; 847.1.

Food, Drug, and Insecticide Administration. 010.; 021.0; 021.1; 021.2; 021.5; 021.6; 022.0; 022.1; 022.41; 022.43; 022.44; 022.49; 035.5; 040.; 100.; 102.2; 103.4; 106.2; 107.2; 107.3; 107.4; 108.1; 108.41; 108.42; 108.43; 108.44; 109.4; 109.7; 118.3; 120.; 125.1; 125.5; 125.9; 126.11; 126.13; 126.2; 126.7; 129.11; 129.12; 130.; 131.22; 131.25; 133.21; 134.22; 134.41; 134.42; 134.44; 134.52; 134.53; 134.54; 134.55; 135.1; 135.9; 142.0; 142.1; 142.3; 142.4; 142.5; 142.6; 142.7; 142.8; 142.93; 142.94; 143.2; 151.1; 151.2; 151.3; 152.0; 153.0; 153.1; 154.11; 154.12; 154.13; 154.19; 154.21; 154.22; 154.23; 154.31; 154.32; 154.33; 154.34; 154.35; 154.36; 154.41; 154.42; 154.43; 154.44; 154.45; 154.49; 154.51; 154.52; 154.53; 154.54; 154.55; 154.56; 154.6; 154.71; 155.1; 160.; 161.1; 161.2; 161.3; 161.4; 162.; 163.1; 163.3; 164.1; 164.2; 164.4; 164.5; 164.6; 170.; 173.; 175.1; 175.3; 175.4; 175.5; 175.6; 175.7; 175.9; 177.2; 177.3; 178.0; 178.3; 178.4; 211.1; 216.; 803.10; 803.13; 810.; 821.0; 830.; 846.63; 881.0.

Forest Service. 401.30.

Department of Commerce—

Aeronautics Branch. 705.6; 724.0; 724.22; 724.24; 724.25.

Bureau of Mines. 501.0; 710.; 711.25; 712.2; 712.3; 714.11; 714.12; 714.21; 714.30; 714.52; 715.12; 715.21; 715.41; 716.13; 716.17; 716.2; 718.21; 721.1; 750.; 751.; 860.; 993.; 997.6.

Bureau of Standards. 021.0; 101.1; 102.3; 103.1; 104.1; 106.1; 107.1; 126.13; 132.21; 160.; 200.; 202.42; 206.0; 300.4; 302.40; 309.2; 331.10; 365.96; 392.12; 397.0; 402.1; 428.29; 429.9; 470.3; 471.3; 476.31; 476.32; 476.4; 476.9; 478.35; 494.; 501.2; 503.0; 511.2; 512.0; 516.0; 516.2; 516.3; 517.2; 518.50; 518.53; 520.; 525.0; 531.0; 532.22; 534.10; 534,12; 546.; 591.; 592.; 600.1; 601.1; 603.40; 604.0; 604.31; 604.32; 607.0; 608.0; 611.0; 614.2; 615.82; 621.12; 621.22; 621.24; 621.25; 621.26; 621.27; 621.30; 631.0; 631.21; 631.41; 641.0; 641.21; 644.21; 645.31; 646.41; 647.20; 651.0; 651.5; 654.52; 662.; 672.; 681.0; 683.0; 683.2; 683.41; 692.1; 692.2; 701.3; 703.1; 710.;

713.5; 714.11; 714.12; 714.34; 714.39; 714.41; 714.42; 714.52; 715.40; 715.50; 716.0; 717.3; 718.5; 718.60; 718.61; 718.64; 718.65; 719.50; 719.60; 721.1; 721.2; 722.32; 726.1; 744.1; 744.2; 745.3; 784.0; 793.5; 801.4; 802.1; 809.1; 821.7; 822.4; 822.5; 830.; 831.1; 832.4; 833.9; 834.9; 838.1; 839.9; 840.1; 843.61; 846.0; 846.11; 846.62; 852.; 871.12; 871.13; 871.21; 914.0; 914.5; 914.6; 915.25; 916.21; 916.22; 917.2; 918.0; 918.36; 919.1; 919.4; 919.80; 919.9; 932.2; 933.0; 933.2; 951.10; 953.2; 957.2; 997.2.

Division of building and housing. 501.2; 516.3; 516.4; 518.50; 518.51; 518.53; 534.11; 534.22; 600.6.

Division of trade standards (commercial standards). 066.6; 066.9; 302.10; 304.4; 304.71; 306.24; 306.36; 309.4; 311.2; 311.5; 312.3; 319.98; 367.2; 402.52; 411.9; 413.52; 423.1; 423.2; 429.9; 475.4; 503.2; 503.4; 527.; 532.23; 592.; 603.56; 607.2; 607.3; 607.4; 608.2; 612.20; 615.82; 617.11; 617.12; 617.13; 617.21; 617.22; 617.23; 617.31; 617.32; 617.33; 617.34; 617.35; 617.42; 617.43; 617.44; 617.5; 617.61; 617.62; 617.63; 617.9; 622.9; 645.23; 645.39; 741.3; 915.58; 918.0; 919.83; 953.2; 983.1.

Division of simplified practice. 154.6; 204.12; 206.5; 302.36; 303.0; 304.90; 315.0; 315.10; 319.3; 326.; 331.20; 341.2; 369.21; 394.5; 398.20; 398.31; 400.0; 400.14; 400.20; 401.49; 402.52; 411.0; 412.0; 412.1; 413.0; 413.9; 428.1; 428.29; 431.11; 437.; 438.3; 470.2; 472.0; 472.32; 477.5; 478.34; 479.2; 481.; 489.; 505.0; 505.15; 511.51; 511.52; 513.; 516.4; 518.50; 521.7; 523.4; 532.1; 532.22; 532.23; 534.11; 534.12; 534.22; 534.25; 541.0; 541.3; 541.4; 545.2; 545.9; 600.2; 603.43; 603.50; 604.20; 604.29; 604.31; 604.32; 605.12; 605.22; 605.24; 605.25; 607.0; 607.5; 608.11; 608.14; 608.31; 608.7; 612.11; 612.12; 612.20; 613.1; 613.5; 614.1; 614.4; 615.11; 615.13; 615.15; 615.20; 615.42; 615.55; 615.61; 615.62; 615.63; 616.11; 616.60; 616.63; 616.8; 616.91; 617.79; 619.1; 642.4; 642.9; 645.4; 646.52; 691.2; 711.42; 712.1; 715.36; 715.49; 716.13; 719.63; 722.38; 729.1; 765.; 766.2; 840.4; 881.0; 915.10; 937.4; 951.12; 951.32; 953.2; 955.1; 955.4; 957.2; 959.4; 959.9; 981.0; 982.2.

Steamboat Inspection Service. 349.5; 425.3; 429.9; 604.11; 605.23; 607.14; 607.3; 607.4; 607.6; 619.1; 642.23; 642.9; 703.1; 703.2; 703.9; 712.1; 716.13; 725.3; 725.40; 725.41; 725.42; 956.2; 997.5.

Post Office Department. 494.; 726.1; 954.4.

Treasury Department—

Bureau of Internal Revenue. 170.; 822.0.

Bureau of Prohibition: 130.; 154.71; 175.1; 175.2; 175.3; 175.4; 175.5; 175.6; 175.7; 175.9; 178.0; 179.; 503.3; 810.; 822.0; 822.3; 822.4; 822.5; 830.; 839.9; 872.0; 881.0.

Bureau of the Public Health Service. 021.0; 731.; 812.; 814.2; 819.9; 882.3; 954.21.

Independent establishments:

Federal Specifications Board. 011.1.; 011.2; 011.4; 011.5; 011.8; 012.2; 012.3; 012.5; 014.3; 015.1; 015.3; 015.5; 018.11; 018.12; 018.13; 018.14; 018.21; 018.22; 018.23; 018.24; 018.25; 018.5; 019.1; 021.1; 021.2; 021.5; 021.6; 021.7; 022.1; 022.3; 022.45; 031.; 034.; 035.1; 035.2; 035.3; 035.6; 036.1; 036.2; 036.3; 037.1; 037.2; 037.4; 041.3; 043.2; 043.3; 063.6; 066.2; 066.3; 066.4; 066.7; 066.8; 066.9; 093.3; 093.7; 100.; 101.1; 102.2; 103.3; 103.4; 105.1; 107.3; 107.4; 108.1; 108.3; 108.41; 108.43; 108.44; 108.9; 109.2–109.6 incl.; 109.9; 111.1; 111.2; 111.4; 111.5; 111.6; 111.91; 111.93; 111.99; 112.1; 112.3; 112.5; 113.1–113.9 incl.; 117.2; 118.2; 118.3; 119.1; 121.1; 121.2; 121.4; 121.5; 121.8; 122.11; 122.13; 122.2; 122.3; 122.4; 122.5; 122.6; 122.7; 123.1–123.4; 123.51; 123.52; 123.6; 124.1; 124.2; 124.4; 125.1; 125.5; 126.11; 126.13; 126.2; 126.6; 126.7; 127.1; 127.2; 127.52; 128.1; 128.3; 129.11; 129.12; 129.13; 129.20; 131.1; 131.21–131.26 incl.; 131.3; 131.4; 131.5; 132.11; 132.13; 132.21; 132.22; 132.3; 132.42; 132.44; 132.45; 133.12; 133.13; 133.21; 133.22; 133.41; 133.44; 133.45; 134.11; 134.21; 134.22; 134.24; 134.41; 134.42; 134.44; 134.45; 134.51–134.53; 134.55; 135.1; 135.3–135.8 incl.; 135.9; 142.5; 142.91; 142.94; 142.95; 151.2; 151.3; 152.1; 152.2; 153.1; 154.11; 154.12; 154.21; 154.23; 154.42; 154.44; 154.45; 154.53; 154.54; 154.55; 154.6;

154.71; 154.9; 155.1; 155.2; 155.4; 155.5; 161.1 to 161.3; 161.5; 164.1 to 164.4; 165.1; 175.4; 175.6; 175.7; 176.3; 177.2; 200.; 202.11 to 202.13; 202.21; 202.22; 202.31; 202.32; 202.41; 202.42; 202.44; 202.45; 202.46; 203.11; 203.2; 204.11; 204.21; 204.23; 204.25; 204.26; 204.27; 204.33; 204.4; 204.51; 204.52; 204.53; 204.54; 204.55; 204.6; 204.92; 204.95; 204.96; 205.1; 206.1; 206.2; 206.3; 206.4; 206.5; 208.1; 208.2; 208.6; 209.1; 211.1; 300.4; 300.7; 301.11; 302.32; 302.36; 302.46; 302.49; 303.1; 303.5; 303.6; 304.2; 304.3; 304.4; 304.5; 304.71; 304.76; 304.8; 304.91; 304.92; 304.94; 306.10: 306.31; 306.41; 306.42; 308.5; 309.2; 314.3; 315.2; 315.31; 315.4; 316.1; 317.1; 319.4; 319.94; 322.1; 326.; 331.16; 331.21; 331.22; 331.3; 362.1; 363.1; 365.98; 366.2; 372.2; 372.3; 372.5; 391.; 392.12; 392.22; 392.23; 392.6; 398.1; 398.21; 398.31; 400.30; 400.42; 400.43; 402.70; 414.1; 425.2; 425.4; 431.13; 435.2; 435.3; 435.5; 470.3; 472.95; 476.21; 478.22; 478.32; 478.34; 478.35; 489.; 494.; 501.5; 502.2; 503.0; 503.1; 503.2–503.7 incl.; 504. 13; 504.19; 504.21; 504.22; 504.23; 504.31; 504.32; 504.33; 504.34; 504.36; 504.41; 504.44; 504.46; 504.49; 504.7; 505.11; 505.13; 505.14; 505.15; 505.16; 505.19; 505.22; 505.31; 505.32; 505.33; 505.34; 505.36; 511.3; 511.52; 511.6; 511.71; 512.11; 512.12; 512.13; 512.14; 512.15; 512.16; 512.2; 513.; 514.2; 514.3; 514.61; 516.11; 516.19; 516.3; 516.4; 517.2; 518.38; 518.57; 518.67; 521.1; 521.2–521.4 incl.; 521.5; 521.6; 521.8; 521.9; 523.1; 523.2; 523.3; 523.4; 524.; 526.9; 531.3; 531.5; 532.1; 532.20; 532.23; 534.11; 534.12; 534.22; 541.4; 545.2; 545.4; 572.; 575.1; 575.2; 593.; 600.1; 600.3; 601.23; 602.2; 603.1; 603.21; 603.26; 603.41; 603.42; 603.43; 603.51; 603.52; 603.53; 603.54; 603.56; 603.57; 604.11; 604.12; 604.13; 604.31; 605.11; 605.12; 605.13; 605.15; 605.24; 605.25; 606.5; 607.0; 607.11; 607.12; 607.14; 607.2; 607.3; 607.4; 607.6; 608.11; 608.12; 608.13; 608.14; 608.15; 608.2; 608.31; 608.32; 608.4; 611.11; 611.12; 611.14; 611.19; 611.21; 611.3; 611.41; 611.49; 612.13; 612.21; 612.23; 613.1; 613.2; 613.4; 613.5; 613.6; 613.7; 614.4; 615.12; 615.33; 615.39; 615.62; 615.64; 615.71; 615.81; 615.9; 616.11; 616.12; 616.13; 616.15; 616.16; 616.17; 616.18; 616.33; 616.42; 616.91; 616.93; 617.12; 617.13; 617.21; 617.22; 617.23; 617.31; 617.32; 617.33; 617.34; 617.35; 617.41; 617.42; 617.43; 617.44; 617.5; 617.61; 617.62; 617.63; 617.73; 617.79; 617.9; 621.11; 621.12; 621.21; 621.22; 621.23; 621.24; 621.26; 621.31; 621.32; 621.33; 622.4; 631.12; 631.31; 631.9; 641.11; 641.12; 641.21; 641.22; 641.23; 642.11; 642.23; 642.24; 642.9; 643.2; 643.3; 644.12; 644.21; 644.22; 644.23; 645.11; 645.12; 645.21; 645.23; 645.24; 645.39; 645.4; 645.9; 646.11; 646.41; 646.59; 647.11; 647.15; 647.21; 647.22; 647.23; 647.24; 647.25; 647.26; 647.34; 647.38; 651.1; 651.3; 651.5; 653.1; 654.2; 654.3; 654.4; 654.51; 654.53; 655.1; 655.2; 655.3; 655.4; 655.5; 655.9; 681.1; 682.; 683.1; 683.2; 683.3; 691.1; 691.2; 692.1; 692.2; 693.1; 693.2; 693.3; 703.2; 707.11; 707.13; 707.21; 707.22; 707.23; 707.24; 707.25; 707.26; 707.28; 707.3; 707.41; 707.43; 707.44; 711.23; 712.1; 712.2; 712.3; 714.21; 714.22; 714.52; 715.11; 715.13; 715.22; 715.41; 715.44; 716.11; 716.12; 716.13; 717.1; 718.29; 718.31; 718.32; 718.35; 718.62; 719.55; 719.56; 719.59; 722.38; 787.; 793.5; 793.6; 801.3; 803.19; 809.3; 821.7; 823.; 831.4; 833.1; 834.1; 834.4; 834.7–834.9; 839.1; 839.38; 839.39; 839.7; 841.41; 841.5; 842.3; 842.4: 842.5; 842.63; 842.64; 842.7; 842.81; 842.85; 842.87; 843.1; 843.2; 843.31; 843.36; 843.8; 844.1; 844.61; 844.65; 844.67; 846.11; 846.21; 846.32; 846.41; 846.62; 848.11; 848.12; 848.7; 849.19; 849.3; 871.12; 871.13; 871.15; 871.19; 871.21; 871.22; 871.23; 871.24; 871.26; 871.27; 871.4; 871.5; 881.17; 881.26; 891.; 914.5; 915.32; 915.56; 919.82; 919.83; 919.89; 931.4; 931.5; 932.1; 932.2; 932.3; 932.5; 932.9; 933.1; 933.3; 933.4; 933.9; 935.; 951.44; 952.14; 953.2; 953.36; 953.37; 953.39; 954.33; 954.36; 955.6; 957.19; 959.5; 973.2; 974.3; 981.1; 981.2; 981.3; 981.4; 981.5; 981.61; 981.62; 981.63; 982.1; 982.2; 982.3; 982.4; 982.9; 991.

Federal Trade Commission. 672.

Interstate Commerce Commission. 093.9; 505.19; 604.22; 701.3; 721.1; 726.1; 951.12; 951.13; 951.31; 951.32; 951.33; 951.43; 951.44; 951.61; 951.62; 951.64; 951.65; 951.72; 953.1; 953.2; 953.36; 954.1; 954.21; 954.22; 954.4; 955.2; 955.7; 956.1; 957.19; 957.2; 958.3; 959.1; 959.9.

National Screw Thread Commission. 607.0; 608.0; 608.2; 608.31; 608.32; 615.42; 645.9; 974.0.

INDEX

Figures listed in the index below refer to numerical classifications as given in the Directory.

A

Abaca fiber 330.
Abrasive cloths 541.4
Abrasive grain sizes for wheels and stones 541.0
Abrasive papers 541.4
Abrasive wheels 541.3
Abrasives 541.
Abrastol 839.9
Absorbent cotton 398.1
Absorbent cotton waste 301.5
Absorbent paper 471.
Absorption bulbs and tubes 918.9
Acacia 217.
Acetanilid 802.2
Acetic acid and anhydride 821.1
Acetic ether 839.9
Acetone 839.1
Acetphenetidin 803.29
Acetyltannic acid 821.9
Acetylene generators and lamps 997.5
Acetylene head lamps, automobile 722.33
Acetylene heating and cooking equipment 614.9
Acetylene welding equipment 767.
Acetylsalicylic acid 802.1
Acid, acetic 821.1
    acetylsalicylic 802.1
    acetyltannic 821.9
    benzoic 802.1
    boracic 821.2
    boric 821.2
    bromauric 821.9
    carbolic 802.1
    chromic 821.9
    citric 821.9
    formic 821.9
    gallic 821.9
    hydrochloric 821.3
    hydrocyanic 821.9
    hydrofluoric 821.4
    hypophosphorous 821.9
    lactic 821.9
    molybdic 821.9
    muriatic 821.3
    nitric 821.5
    nitrohydrochloric 821.9
    oleic 821.9
    oxalic 821.6
    perchloric 821.9
    phosphoric 821.9
    phosphotungstic 821.9
    picric (explosive) 803.31
    picric (medicinal) 802.1
    pyrogallic 802.1
    salicylic 802.1
    stearic 045., 821.9
    sulfuric 821.7
    sulfurous 821.7
    tannic 821.9
    tartaric 821.9
    trichloracetic 821.9
Acid-resisting rivet steel 622.9
Acids, coal-tar 802.1
    except coal-tar 821.
Aconitine 811.
Adapters (chemical apparatus) 918.9
Adhesive plaster 204.12
Adhesive tape 204.12
Adhesives, office 932.5
Adjuster, casement 617.5
    window stop 617.5
Admiralty condenser tubes 645.24
Admiralty gun metal castings 646.41
Adzes 616.11
Aeronautic equipment. (*See also* aircraft.)
Aeronautic instruments 724.26
Aeronautic safety code 724.3
Aeronautical symbols 724.0
Aggregate, coarse 512.14
    fine 512.13
Agricultural implements and machinery 730–739
Air-brake hose 202.11
Air-brake hose couplings and gauges 202.11
Air-brake hose gaskets 707.13
Air brakes, railway 726.2
Air circuit breakers 714.51
Air compressors 791.2
Air connections for railway cars 726.2
Air gauges 793.2
Air hose 202.1
Air pillows 204.25
Air tanks 956.2
Aircraft. (*See also* Aeronautic) 724.
Aircraft accessories and parts 724.2
Aircraft control equipment 724.25
Aircraft parts and fittings 724.22
Airdromes 518.51
Airplane cloth, cotton 396.
Airplane engines 705.6
Airplane stock lumber 413.3
Airplanes 724.3
Airship fabrics 396.
Airships 724.4
Alarms, burglar 718.31
    fire 718.32
Albuminized iron 839.34
Albuminometers 918.81
Alcohol, amyl 822.1
    butyl 822.2
    ethyl, denatured 822.3
        pure grain 822.4
    medicated 822.4
    methyl 822.5
    wood 822.5
Aldehol 839.9
Aldehyde 824.
Alder grading rules (lumber) 400.39
Alfalfa hay 111.1
Alfalfa meal 112.5
Alfalfa seed 241.
Altimeters 917.2
Alimentary pastes 108.0
Alkali hay 111.96
Alkalimeters 918.9
Alkaloids 811.
Alley arm brace 719.62
Alleys, bowling 943.98
Alloy compounds for steel production 621.2
Alloy steel products 621.3, 622.
Alloys:
    aluminum 631.11
    antimony 632.3
    bearing metal 692.
    copper 643.
    dental amalgam 691.1
    gold, dental 662.
    lead 651.6
    magnesium 695.
    nickel chrome 656.
    nickel copper 654.
    nickel copper zinc 655.
    silver 691.1
    tin 681.43
    zinc 633.5
Allspice 154.21
Allspice extract 175.9
Almond extract 175.1
Almond oil 813.4
Almond paste 135.1
Almonds 135.1
Aloe powder 819.1
Alpha-cellulose 846.5
Alternating current generators 711.11
Alternating current motors 711.21
Alternators 711.11
Alum 838.2
Aluminum alloy products (rapid reference). (*See* index for individual commodity made of aluminum alloy.)
Aluminum alloys 631.11
Aluminum ammonium sulfate 838.4
Aluminum bronze powder and paint 847.1
Aluminum bronze products 647.1
Aluminum chloride 838.5
Aluminum compounds 838.
Aluminum fluoride 838.7
Aluminum hydroxide 838.1
Aluminum metal, medicinal 838.9
Aluminum oxide 838.6
Aluminum oxide abrasive 541.0
Aluminum oxide abrasive cloth 541.4
Aluminum potassium sulfate 838.2
Aluminum powder for paints 847.1
Aluminum products 631.
Aluminum products (rapid reference). (*See* index for individual commodity made of aluminum.)

Aluminum sulphate 838.3
Amalgams, dental 691.1
  silver 691.1
Amaranth (food dye) 803.13
Amboceptors 918.82
Ambulances, automobile 723.15
American cheese 022.45
American cotton linters 301.3
American Egyptian cotton 300.1
American upland cotton 300.1
Amidopyrine 839.9
Ammeters 714.31
Ammonia 831.1
Ammonia gauges 793.2
Ammoniated mercury 839.36
Ammonium acetate 831.9
Ammonium and ammonium compounds 831.
Ammonium benzoate 831.9
Ammonium bicarbonate 831.3
Ammonium bichromate 831.2
Ammonium bromide 831.9
Ammonium carbonate 831.3
Ammonium chloride 831.4
Ammonium hydroxide 831.1
Ammonium hypophosphite 831.9
Ammonium iodide 831.9
Ammonium molybdate 831.9
Ammonium nitrate 831.5
Ammonium oxalate 831.9
Ammonium persulphate 831.7
Ammonium phosphate 831.6
Ammonium picrate 831.9
Ammonium salicylate 831.9
Ammonium sulphate 831.7
Ammonium sulphide 831.9
Ammonium thiocyanate 831.9
Ammonium valerate 831.9
Ammonium valerianate 831.9
Ammunition 860–869
Ampules 918.83
Amusements, indoor 942.
Amyl acetate 839.2
Amyl alcohol 822.1
Amyl nitrite 839.9
Anchor bolts, guy 608.31
Anchor chain, stud link 603.53
Anchor plate (pole line hardware) 719.62
Anchor rods, guy 719.62
Anchors, cast steel, ship 611.49
  forged steel, ship 611.59
  guy 719.62
  window cleaners' 645.9, 654.59
  wrought iron, ship 611.3
Anchovies, canned 035.8
Anchovy paste 039.2
Anemometers 917.1
Anesthetical apparatus 915.30
Anesthetics 815.
Angle-measuring instruments 916.22
Angle valves 607.6
Anhydride, acetic 821.1
  boric 821.2
  molybdic acid 821.9
Anhydrides, acid 821.
Anhydrous ammonia 831.1
Anilin 802.2
Aniline black (dye) 803.10
Aniline blue 803.19
Aniline oil and salts 802.2
Anilin sulphate 802.2
Animal oil, medicinal 813.9
Animals 000-009
Anisated powder, rhubarb, and magnesia 819.1
Anise (spice) 154.31
Anise, sweet (vegetable) 124.5
Anise extract 175.9
Anise oil 813.9
Annealing cups, laboratory 918.9
Anodes, battery 712.5
Antennas, radio 718.61
Anthracene oil 801.3
Anthracite coal 501.1
Antifouling paints and compounds 844.1
Antifriction metals 692.
Anti-hog-cholera serum 812.
Antimeningococcic serum 812.
Antimonial powder 819.1
Antimony and antimony products 632.
Antimony compounds and salts 839.31
Antipneumococcic serum 812.
Antipyrine 839.9
Antipyrine and caffeine 811.
Antirattlers, sash 617.5
Antiseptic powder 819.1
Antitoxin, diphtheria 812.
  gas gangrene 812.
  scarlet fever streptococcus 812.
  tetanus 812.
Antityphoid vaccine 812.
Anvils 615.51
Apomorphine hydrochloride 811.
Apparatus, scientific and professional 910-919
Apple butter 134.51
Apple-butter jars 955.4
Apple pectin pulp, dried 119.9
Apple pomace, dried 119.9
Apples, canned 134.21
  dried 133.21
  fresh 132.21
Apple sauce 134.21
Applicator, wooden, surgical 915.28
Apricots, canned 134.41
  dried 133.41
  fresh 132.41
Aprons, cotton 311.92
  rubber 203.5
  surgeons', rubber 204.51
Aqua ammonia 831.1
Arbitration test bar for cast iron 600.1
Arc lamps 716.16
Arc welding apparatus 767.
Arches, bridge 518.46
  masonry 518.84
Argentum compounds 839.37
Armored cable 715.41
Armored cord 715.42
Army duck, gray 303.1
Aromatic powder 819.1
Aromatic powder of chalk 819.1
Aromatic powder of chalk and opium 819.1
Arresters, lightning 715.51
Arsenic, medicinal 814.2
  white (insecticide) 881.18
Arsenic disulphide 814.2
Arsenic trioxide, insecticidal 881.18
  medicinal 814.2
  reagent and oxidimetric standard 839.9
Arsenious iodide 814.2
Arsenious oxide 814.2
Arsenious sulphide 814.2
Arsphenamine 814.2
Artichokes, fresh 121.7
Artificial leather 066.7
Artificial silk manufactures 397.
Artificial stones, dental 915.10
Asaprol 839.9
Asbestine pigments 841.1
Asbestos, electrical insulating 719.51
  unmanufactured 545.1
Asbestos boiler covering 707.42
Asbestos cement 545.3
Asbestos copper gaskets 707.11
Asbestos felt 545.9
Asbestos millboard 545.2
Asbestos packing 707.21
Asbestos paper 545.2
Asbestos pipe covering 707.42
Asbestos roll board 545.2
Asbestos textiles 545.4
Asbestos yarn 545.4
Ash grading rules (lumber) 400.39
Ashes, wood, as fertilizer 850.
Ashlar masonry 518.82
Ashlar stone 511.9
Asparagus, canned 128.1
  fresh 124.1
Asparagus sprays 259.
Aspen grading rules 400.39
Asphalt, native 505.11
  oil 505.14
  petroleum 505.14
  road building 505.14
  roofing and waterproofing 505.16
Asphalt block floors for buildings 518.56
Asphalt cement 505.13
Asphalt felt for roofing and waterproofing 505.16
Asphalt filler (paving) 505.15
Asphalt foundation for roads 518.27
Asphalt linings for barrels 505.19
Asphalt lubricating oils, heavy 504.11
Asphalt mastic flooring 505.17
Asphalt pavements 518.37
Asphalt shingles 505.16
Asphalt treated fabric 392.4, 505.16
Asphalt varnish 846.4
Asses 005.2
Athletic clothing 943.91
Athletic gloves 068.1
Athletic goods 943.
  leather 068.1, 069.1
Athletic mittens 068.1
Athletic outfits 943.92
Athletic shoes 067.8
Athletic underwear, knit, cotton 309.4
Atomizers, medical 915.34
Atropine 811.
Atropine sulphate 811.
Attachment plug, electric 715.21
Audio transformers 713.5
Augers 616.12
Auric chloride 839.39
Auric sulphide 839.39
Automatic scales 793.5
Automatic sprinkler systems 976.
Automatic stations, electrical 714.13
Automobile accessories and parts 722.3
Automobile engines 705.1
Automobile fire trucks 722.2
Automobile lamps, electric 716.12
Automobile motor trucks 722.1
Automobile nomenclature 722.0
Automobile parts and fittings 722.3

- Automobile soap 871. 4
- Automobiles, electric 721. 2
  - except electric 722.
- Autotransformers 713. 5
- Avocados, fresh 131. 6
- Awls 616. 21
- Awning cloth 303. 6
- Awning pulleys 617. 9
- Awnings 319. 91
- Axe handles 428. 29
- Axes 616. 11
- Axle generators, railway 711. 12
- Axle liners 692.
- Axle lubricant for automobiles 504. 49
- Axle steel 603. 24
- Axles, airplane wheel 724. 23
  - alloy steel 622. 6
  - carbon steel 611. 52
  - wagon 413. 54
- Axminster carpets 366. 2
- Axminster rugs 366. 1

B

- Babbitt metal 692. 1
- Babbitting masks 914. 5
- Baby carriages 727.
- Back lining paper (printing industry) 479. 4
- Backboards, basketball 943. 97
- Bacon 012. 5
- Bag leather 066. 9
- Bags, banana 957. 2
  - bean 957. 19
  - bread, glassine 957. 2
  - burlap 957. 19
  - carrying 957. 3
  - cement, paper 957. 2
  - cloth 957. 1
  - flour, cloth 957. 19
  - fuel 957. 11
  - garment, paper 957. 2
  - glassine 957. 2
  - grocers' 957. 2
  - hot water 204. 23
  - ice, rubber 204. 21
  - laundry 957. 19
  - lime, paper 957. 2
  - mail 957. 12
  - notion and millinery 957. 2
  - obstetrical, rubber 204. 22
  - paper 957. 2
  - politzer 204. 27
  - salt 957. 19
  - sand 957. 13
  - shopping 957. 3
  - sugar, cloth 957. 19
    - paper 957. 2
  - tool 957. 14
  - triplex 957. 19
- Bagging, jute 322. 2
  - waste 390. 5
- Bake ovens, japanning, and enameling 614. 9
- Bakelite 719. 58
- Bakers' caps 395. 11
- Bakery machinery 786.
- Baking powder 155. 1
- Baking soda 155. 2
- Balances 793. 5
- Balata belting 207.
- Baling material, jute 322. 3
- Ball, baseball 943. 1
  - basket 069. 1
  - bowling 943. 1
  - code 209. 91
  - foot 069. 1
  - golf 209. 91
  - hand 943. 1
  - hockey 943. 1
  - lacrosse 209. 91
  - playground 943. 1
  - rubber 209. 91
  - soccer 069. 1
  - squash handball 943. 1
  - tennis 943. 1
  - volley 069. 1
  - water polo 069. 1, 209. 91
- Ball-and-socket joints, automobile 722. 33
- Ball bearings 766. 2
- Ball clay 531. 1
- Ball cocks for flush tanks 607. 6
- Ball mills (laboratory apparatus) 918. 9
- Ball stud, automobile 722. 33
- Ballast, railway 511. 73
- Balloon fabrics 396.
- Balloon tires, automobile 206. 1
- Balloons 724. 1
- Balsams 214.
- Bamboo furniture 439. 1
- Bananas 131. 1
- Band instruments 925.
- Band saw, metal cutting 615. 62
  - wood cutting 616. 17
- Bands, infants', cotton 309. 4
  - iron 604. 22
  - pole 719. 62
- Bands, rubber 208. 2
  - steel 604. 22
- Bandage, gauze 398. 31
  - plaster of Paris 398. 31
  - rubber 204. 11
- Bandage gauze 398. 2
- Bandings, silk 374.
- Banjos 929.
- Bank checks and drafts 489.
- Banner silk 373. 22
- Barbed wire 603. 43
- Barbital 819. 9
- Barium acetate 835. 8
- Barium carbonate 835. 1
- Barium chloride 835. 2
- Barium compounds 835.
- Barium dioxide 835. 3
- Barium hydroxide 835. 4
- Barium iodide 835. 7
- Barium nitrate 835. 5
- Barium sulphate 835. 9
- Barium sulphide 835. 6
- Bark, quillai 871. 24
  - soap 871. 24
- Barley, grain 101. 1
  - ground 119. 9
- Barley feed 119. 9
- Barley flour 101. 2
- Barley hay 111. 2
- Barley hulls 119. 9
- Barn siding 411. 1
- Barographs 917. 2
- Barometers 917. 2
- Barrel headings 421. 3
- Barrel hoops, iron and steel 604. 22
  - wood 421. 3
- Barrel nails 608. 11
- Barrel staves, slack 421. 2
  - tight 421. 1
- Barrels, fiber 951. 11
  - fruit and vegetable 951. 13
  - lime 951. 10
  - metal 951. 12
  - petroleum 951. 13
  - pork 951. 13
  - slack 951. 13
  - turpentine 951. 13
  - wooden 951. 13
- Barrows 729. 2
- Bars, alloy steel 621. 31
  - aluminum and aluminum alloy 631. 13
  - aluminum bronze 647. 12
  - brass 644. 12
  - bronze 646. 12
  - chisel 616. 91
  - claw 616. 91
  - clothes-hanger 617. 9
  - copper, cast 641. 11
    - rolled 641. 12
  - copper nickel 654. 2
  - crow 616. 91
  - digging 616. 61
  - german silver 655. 1
  - grate 611. 15
  - joint, railroad 606. 2
  - lead 651. 2
  - leverage 616. 91
  - lining track 616. 91
  - manganese bronze 647. 22
  - monel metal 654. 2
  - nickel 653. 2
  - nickel bronze 655. 1
  - nickel copper 654. 2
  - nickel-copper-zinc alloy 655. 1
  - nickel silver 655. 1
  - phosphor bronze 647. 32
  - pinch 616. 91
  - push (builders' hardware) 617. 34
  - reinforcing, steel 605. 25
  - shutter 617. 9
  - splice, railroad 606. 2
  - spring steel 603. 33
  - steel, automotive 603. 27
    - bolt stock 603. 21
    - case hardening 603. 22
    - commercial grade 603. 23
    - for reforging 602. 2
    - forging 603. 24
    - nut stock 603. 21
    - railway 603. 27
    - reinforcing 605. 25
    - rivet stock 603. 21
    - screw stock 603. 21
    - spring 603. 33
    - tool 603. 32
    - welding 603. 26
  - tamping 616. 61
  - tool steel 603. 32
  - welding, steel 603. 26
  - wrought iron 603. 1
- Barytes pigments 841. 2
- Base bands, automobile tire 722. 36
- Baseball bases 943. 4
- Baseball bats 429. 9
- Baseball plates 943. 4

Baseballs 943.1
Baseboard (interior trim), wood 411.42
Bases, automobile lamp 716.12
  baseball 943.4
  cut out 714.22
  fuse block 714.22
  plaster, metal 605.24
  switch 714.22
Basins, cloth 399.2
  hospital 915.41
  rubber 204.24
Basket ball 069.1
Basket crates, fruit and vegetable 954.35
Basket-ball goods and apparatus 943.97
Basket nails 608.11
Baskets, basket-ball 943.97
  berry 952.11
  climax, for grapes 952.11
  coal 952.13
  fiber board 952.14
  fruit 952.11
  grape 952.11
  laboratory 918.9
  round stave 952.12
  vegetable 952.11
  waste paper 435.6
Basswood grading rules 400.31
Bat, baseball 429.9
Bath inclosures, marble 511.3
  slate 511.52
  soapstone 511.6
Bath mats 319.3
Bath thermometers 919.81
Bath towels, cotton 319.3
  linen 339.54
Bathing trunks, woolen knit 367.6
Bath robes, cotton 311.98
  woolen 368.3
Bathroom furniture, wooden 431.3
Bathrooms, tiled 518.59
Baths, laboratory 918.9
Bathtubs, cast iron 612.21
  procelain 532.23
Baton, relay 429.9
Battens (lumber molding) 411.42
Batteries 712.
  aircraft 712.2
  automobile 712.2
  dry cell 712.1
  explosion proof 712.2
  flashlight 712.1
  gravity 712.1
  isolated electric plant 712.2
  locomotive 712.2
  primary 712.1
  radio, A, B, and C (dry) 712.1
    A and B (storage) 712.2
  railway signal, primary 712.1
    storage type 712.2
  storage 712.2
Battery anodes and cathodes 712.5
Battery box, cement concrete 516.9
Battery cases and jars 712.3
Battery cells, electric vehicle 721.2
Battery copper, gravity 712.5
Battery electrolyte 712.4
Battery jars and covers 712.3
Battery tray terminal lugs for electric vehicles 721.2
Battery trays, electric vehicle 721.2
Battery zincs, gravity 712.5
Batting, cotton 319.1
Bauxite, refined 838.1
Bayberry powder 819.1
Beakers 918.2
Beams, concrete, for buildings 518.5
  wood 412.19
Bean bags 957.1
Beans (feeding stuff) 119.9
Beans, canned 126.11
  cocoa or cacao 151.1
  dry 126.11
  fresh 122.11
  lima, fresh 122.11
  string, fresh 122.11
Bearing bronzes 692.2
Bearing metals 692.
  phosphor bronze 692.2
  white 692.1
Bearings, ball 766.2
  except ball and roller bearings 692.3
  roller 766.2
  tail shaft, ship 725.42
Beaver cloth 365.11
Bed blankets, cotton 315.5
  woolen 369.21
Bedding course for brick pavements 518.29
Bedding materials, cotton 315.
Bedding straw 113.9
Bedford cord (woolen goods) 365.12
Bedpans 915.47
Bedroom furniture, wooden 431.1
Bedroom slippers, woolen and felt 368.6
Bedspreads, cotton 315.4
Bedsprings 613.1
Beds, metal 613.1
  wooden 431.11
Beech grading rules 400.39
Beef 011.
  canned 018.1
  corned 018.12
  dried 018.13
  pickled 011.95
  prepared or preserved 018.1
  roast 018.18
  smoked 011.94
Beef carcasses 011.1
Beef cattle 001.2
Beef cuts 011.91
Beef extract 099.1
  medicinal 819.4
Beef hearts 011.2
Beef kidneys 011.5
Beef knuckles 011.3
Beef livers 011.4
Beef tongue, canned 018.11
  fresh 011.6
Beer 179.
Beeswax 046.
Beet pulp feed 119.1
Beet tops, canned 125.9
Beets, canned 127.1
  fresh 123.1
Bell cord, cotton 302.41
Bell ringing transformers 713.5
Belladonna 811.
Belladonna extract powder 819.1
Bellows, blacksmiths' and molders' 615.52
Bellows leather 069.6
Bells, electric 718.33
  highway crossing 718.33
  signal 718.33
Belt duck 303.97
Belt rivets 608.4
Belt speeds, stationary gasoline engine 705.3
Belting, balata 207.
  canvas 314.1
  conveyor, cotton 314.3
    rubber 207.1
  cotton 314.1
  elevator, rubber 207.2
  leather 066.3
  rubber 207.
  transmission, balata 207.3
    cotton 314.1
    leather 066.3
    rubber 207.3
  woven hair 314.1
Belts, cotton (clothing) 311.8
  fan, automobile 722.31
  leather (clothing) 069.3
  lineman's leather 069.3
  safety 069.3
  tractor 729.5
  window cleaners' 069.3
Bench plates, tinners' 615.73
Bench stakes, tinners' 615.73
Benne oil 142.8
Benzaldehyde 824.
Benzene 801.1
Benzene cans 959.1
Benzine 503.1
Benzine soap 871.24
Benzo red (dye) 803.10
Benzoic acid 802.1
Benzol 801.1
Bergamot oil 813.9
Bermuda hay 111.3
Berries, canned 134.11
  dried 133.11
  fresh 132.11
Berry baskets 952.11
Berry boxes, wooden 953.32
Berry crates 954.32
Berths, ship, metal 613.1
Beta-naphthol 801.4
Bevel siding (lumber) 411.1
Bevels 616.31
Beverage bottles 955.1
Beverages 170–179
Bibb, laundry tray 607.6
  sink 607.6
Bible paper 475.71
Bicycle tires 208.2
Bicycles 725.1
Billboards 998.
Billets, alloy steel 621.31
  copper 641.11
  iron 602.1
  steel 602.2
Billiard cloth 365.91
Binders, office 932.6
Binders board 472.32
Binding machinery 788.
Binding posts, meter 714.37
  radio 718.69
Bindings, cotton cloth 319.92
  silk 374.
Binoculars 914.2

- Bins, bakery 786.
  - dump and storage 959. 7
- Biological apparatus and supplies 918. 8
- Biological medicinals 812.
- Biological stains 803. 19
- Birch grading rules 400. 32
- Birch tar oil 813. 9
- Bird's-eye (diaper) cloth 308. 5
- Biscuit 108. 9
- Bismuth and bismuth products 633.
- Bismuth chloride 836. 1
- Bismuth compounds 836.
- Bismuth nitrate 836. 2
- Bismuth subcarbonate 836. 9
- Bismuth subgallate 836. 9
- Bismuth subnitrate 836. 3
- Bismuth subsalicylate 836.
- Bismutbous oxide 836. 9
- Bitter-almond oil 813. 4
- Bitter-orango oil 813. 9
- Bitters 177. 1
- Bitts, mooring, cast iron 611. 13
    - cast steel 611. 49
- Bituminous coal 501. 2
- Bituminous concrete foundation for roads 518. 26
- Bituminous concrete pavements 518. 34
- Bituminous fillers (paving) 505. 15
- Bituminous macadam foundation for roads 518. 25
- Bituminous macadam pavements 518. 34
- Bituminous materials 505. 1–505. 9
- Bituminous saturated fabric 392. 4
- Black pigments 842. 81
- Blackberries, canned 134. 11
  - fresh 132. 11
- Blackboard chalk 937. 1
- Blackboard slate 511. 51
- Blackboards 937. 4
- Blacking and dauber brushes 982. 4
- Blades, hack-saw 615. 62
  - propeller, bronze 646. 41
  - razor 612. 12
- Blanc fixe (pigment) 842. 1
- Blankets; cotton 315. 5
  - horse, cotton 319. 96
    - jute 329. 2
    - woolen 369. 22
  - printers' 369. 23
  - rubber 204. 31
  - street 339. 6
  - woolen 369. 21
- Blanks, cardboard 474. 1
- Blasting machines for mines 751.
- Bleaches 891.
- Blended sirup 164. 3
- Blind fastener 617. 43
- Blind hinges 617. 12
- Blinds, outside 423. 3
  - slat 423. 3
- Block signals, railway 718. 41
- Blocking cord, linen 331. 14
- Blocks, concrete 516. 4
  - fuse 714. 22
  - gage 615. 82
  - granite 511. 71
  - gypsum 514. 62
  - hoisting 611. 16
  - magnesia molded 572.
  - stone 511. 71
  - terminal 715. 39
  - wood, for pavements and floors 402. 3
- Blood flour 098. 1
- Blood meal 098. 1
- Bloomers, knit, rayon 397. 12
- Blooms, alloy steel 621. 31
  - iron 602. 1
  - steel 602. 2
- Blotter holders 931. 5
- Blotters 931. 5
- Blotters for grinding wheels 541. 3
- Blotting paper 471. 1
- Blouses, boys' cotton 311. 5
- Blow torches 615. 72
- Blower and exhaust systems 791. 0
- Blowers 791. 1
- Blowpipes, welding and cutting 767.
- Blue cloth, woolen 365. 21, 365. 22
- Blue denim hats 395. 22
- Blue lead pigments 842. 61
- Blue pigments 842. 82
- Blueberries, fresh 132. 11
- Blue-print cloth 392. 12
- Blue-print paper 478. 34
- Bluing 803. 11
- Board, binders 472. 32
  - box, paper 472. 16
  - bristol 474. 3
  - chip (plain, tack board, test) 472. 31
  - chip, jute lined and manila lined 472. 11
    - pasted 472. 21
    - sheet lined 472. 22
  - cork 425. 2
  - drawing, bristol 473. 9
  - elastic (spring board) 429. 9
  - fiber 472. 93
  - friction (paper) 472. 33
- Board, fuller 472. 92
  - illustrating (paper) 472. 95
  - jute 472. 34
  - kraft 472. 93
  - leather (paper) 472. 35
  - manila 472. 12
  - mill (paper board) 472. 94
  - news 472. 13
  - paper, lined, marble grained 472. 19
  - pasted 472. 2
  - plaster, gypsum 514. 61
  - press 472. 36
  - pulp, combination 472. 14
    - solid 472. 37
  - railroad (paper) 474. 11
  - solid (paper) 472. 3
  - spring 429. 9
  - straw, corrugated 472. 23
    - jute lined, manila lined, and vat lined 472. 15
    - sheet lined 472. 23
    - solid 472. 38
  - tag 474. 5
  - wall (paper) 472. 24
- Boards, common (lumber) 402. 42
  - panel, electric 714. 41
  - paper 472.
- Boat stock lumber 413. 4
- Boats 725. 3
  - combustion (laboratory) 918. 9
- Bob sleighs 729. 6
- Bobbinet 317. 1
- Bodies, automobile 722. 37
- Bogus wrapping paper 477. 1
- Boiler code 703. 0
- Boiler compound, antifoaming 882. 2
- Boiler covering, asbestos 707. 42
- Boiler insulation, fire clay 707. 45
- Boiler lagging 707. 4
  - asbestos 707. 42
  - magnesia 707. 43
- Boiler plate zinc 683. 2
- Boiler plates, iron and steel 604. 11
- Boiler rivets 608. 4
- Boiler staybolts 608. 31
- Boiler tubes 703. 2
- Boilers, gas, house heating 614. 4
  - hot water heating plant 614. 4
  - hot water supply 614. 4
  - house heating 614. 4
  - marine 703. 1
  - miniature 703. 1
  - power 703. 1
  - range 614. 1
  - steam heating 614. 4
- Boiling flasks 918. 9
- Bollards, mooring, for docks 611. 49
- Bologna style sausage 018. 22
- Bolsters, railway car truck, cast steel 611. 49
    - pressed steel 605. 13
  - wagon 413. 54
- Bolt fastener, sash 617. 43
- Bolt locks 617. 61
- Bolt stock, steel 603. 21
- Bolters, flour 786.
- Bolting silk 373. 23
- Bolts, alloy steel 622. 1
  - chain, door locking 617. 61
  - connecting rod, alloy steel 622. 1
    - automobile 722. 33
  - cremone, door locking 617. 61
  - espagnolette, door locking 617. 61
  - flush, door locking 617. 61
  - foot, door locking 617. 61
  - high temperature service 622. 1
  - insulated 719. 63
  - propeller (aeronautic), alloy steel 622. 1
  - steel and iron 608. 31
  - track, alloy steel 622. 1
    - steel 606. 4
  - window spring 617. 61
- Bond, impedance, railway track 718. 49
- Bond writing paper 478. 11
- Bonding, track circuit 718. 49
- Bonding wire, copper 715. 44
  - iron and steel 715. 43
- Bone, raw and ground (fertilizer) 850
- Bone black 842. 4
- Bone meal 098. 1
- Bone plates, steel 915. 58
- Bones 091.
- Book cloth 392. 21
- Book paper 475. 72
- Bookcases, metal 613. 2
  - wooden 431. 61
- Booklets 484.
- Books, composition 481.
  - tour 481.
- Booms, cargo, tubular steel 725. 41
- Booth, roadway telephone, wooden 429. 9
- Boots, hip 203. 11
  - leather 067. 2
  - rubber 203. 11
- Boracic acid 821. 2
- Borax 834. 3

Bordeaux mixture 881. 23
Boric acid and anhydride 821. 2
Boring machines 741. 2
Boston brown bread 108. 1
Bottle boxes 953. 36
Bottle washing compound 871. 29
Bottles 955. 1
  water, rubber 204. 23
Bottling machinery 781.
Bougies 915. 21
Bouillon cubes 099. 1
Bowling balls 943. 1
Bowling goods and apparatus 943. 98
Bowling pins 429. 9
Bowls, earthenware and stoneware 533. 1
Box cars 726. 1
Box lumber, ordinary 413. 9
  veneer 413. 52
Box nails 608. 11
Box shooks 421. 4
Boxboard (paper) 472. 16
Boxes, battery 712. 3
  berry, wooden 953. 32
  boot and shoe, fiber and strawboard 953. 2
  bottle 953. 36
  branch, electrical 715. 12
  calibration, for testing machines 919. 9
  canned food, wooden 953. 37
  casket 959. 3
  cheese 953. 2
  cigar, fiber board 953. 2
  cigarette 953. 2
  connection, electrical 715. 12
  corrugated paper board 953. 2
  cranberry, wooden 953. 34
  cut-out, electrical 715. 12
  document, wooden 435. 4
  dried fruit 953. 31
  egg, wooden 953. 36
  feeder, electrical 715. 12
  fiber board 953. 2
  folding, for department stores 953. 2
  fruit, fiber board 953. 2
    wooden 953. 31
  hat and cap 953. 2
  hosiery 953. 2
  journal 611. 22
  junction, electrical 715. 12
  lemon 953. 32
  lug, wooden 953. 35
  metal 953. 1
  orange and grapefruit 953. 31
  outlet, electrical 715. 12
  paper 953. 2
  raisin 953. 31
  set-up, for department stores 953. 2
  shelter, telephone 429. 9
  shoe and boot, wooden 953. 36
  stuffing, stern tube, ship 725. 42
  sweat 953. 31
  switch, electrical 715. 12
  underwear 953. 2
  vegetable, fiber board 953. 2
    wooden 953. 33
  wooden 953. 3
    for shipment of dangerous articles 953. 36
Braces, carpenters' 616. 12
  cross arm 719. 62
Brackets, clothes pole 617. 62
  handrail 617. 62
  running board, automobile 722. 37
  service (pole-line hardware) 719. 62
  shelf 617. 62
  towel rack, brass 645. 4
  trolley wire supporting 719. 63
Brads 608. 12
Braid, cotton 319. 92
  silk 374. 1
  woolen 369. 1
Braiding silk 372. 1
Brake beam gage 611. 42
Brake beams, railway 611. 42
  wagon 413. 54
Brake drums, automobile 722. 38
Brake lining, automobile 722. 38
Brake rigging, railroad car 726. 2
Brake shoes, railway 611. 43
Brakes, air, railway 726. 28
  automobile 722. 38
  hand, railroad car 726. 2
  industrial truck and tractor 722. 38
Bran, corn 118. 2
  rice 119. 5
  rye 118. 9
  wheat 118. 2
Bran breakfast foods 109. 6
Branch boxes, electrical 715. 12
Brandy 171.
Brass products 644.
Brass products (rapid reference). (*See* index for individual commodities made of brass.)
Brassards 399. 1
Brazil nuts 135. 9
Brazing solder 693. 2
Brazing wire, brass 645. 12
Bread 108. 1
Bread, hard (biscuit) 108. 9
Breakfast foods, corn 109. 3
  oat 109. 4
  rice 109. 5
  wheat 109. 6, 109. 7
Breast drills 615. 12
Breathing apparatus 993.
Breeches, cotton 311. 4
  woolen 368. 1
Brewers' dried grains 119. 4
Brewers' machinery 783.
Brick 534. 1
  common 534. 11
  concrete 516. 4
  face 534. 11
  fire 534. 12
  fire clay 534. 12
  insulating 534. 12
  paving 534. 11
  sand lime 513.
  sewer 534. 11
  silica 534. 12
  vitrified 534. 11
Bridge, Wheatstone 714. 36
Bridge arches 518. 46
Bridge construction, masonry and concrete 518. 4
Bridge controllers, electric 714. 11
Bridge floors, concrete 518. 4
  wooden 412. 9
Bridge girders, concrete 518. 44
Bridge slabs, concrete 518. 44
Bridge steel, structural 605. 11
Bridges, highway, concrete 518. 41
    steel 605. 21
  railway, steel 605. 21
  steel 605. 21
  wooden 412. 2
Brilliant blue FCF (food dye) 803. 13
Brilliant green (biological stain) 803. 19
Brine 834. 9
Bristol board 474. 3
Bristol cardboard, index 474. 2
  mill 474. 3
  wedding 474. 4
Bristol drawing board and paper 478. 32
Broad silk 373. 20
Broadcloth, woolen 365. 13
Broccoli, fresh 121. 9
Broken slag 512. 2
Broken stone 512. 15
Broken-stone foundation for roads 518. 24
Broken-stone pavements 518. 33
Bromauric acid 821. 9
Bromine 839. 9
Bronze bearing metal 692. 2
Bronze blue (pigment) 842. 2
Bronze powders and vehicle (paint) 847.
Bronze products 646.
Bronze products (rapid reference). (*See* index for individual commodity made of bronze.)
Bronzing liquid 847. 4
Broom corn 294.
Broom nails 608. 11
Broom twine 302. 33
Brooms, corn 981. 1
  factory 981. 64
  household 981. 5
  industrial 981. 6
  pavement 981. 62
  push 981. 63
  rattan 981. 2
  scrubbing 981. 61
  street sweeping 981. 62
  warehouse 981. 64
  whisk 981. 5
  wire 981. 3
Brown bread 108. 1
Brown cotton sheeting 304. 76
Brown pigments 842. 83
Brown process paper (brown print) 478. 34
Brown rice 105. 1
Brush copper 642. 61
Brush shunts, carbon brush 715. 49
Brush wheels, dental 915. 10
Brushes, blacking and dauber 982. 4
  calcimine 982. 2
  carbon (electrical) 711. 42
  casting 982. 3
  cleaning 982. 3
  clothes scrubbing 982. 3
  cuspidor 982. 3
  dauber 982. 2
  deck scrubbing 982. 3
  dust 982. 3
  fiber 982. 3
  floor scrubbing 982. 3
  flowing 982. 2
  garage, fiber 982. 3
  glue 982. 9
  hair, military 982. 1
  hair floor sweep 981. 4
  industrial 982. 5
  laboratory 918. 3
  lacquering 982. 2

Brushes, marking 982.2
  mottling 982.2
  paint 982.2
  polishing 982.4
  radiator bronzing 982.2
  radiator dusting 982.3
  roof 982.2
  sash tool 982.2
  scrub 982.3
  shaving 982.1
  sidewalk 982.3
  stamping 982.9
  stencil 982.2
  toilet 982.1
  tooth 982.1
  varnish 982.2
  wall 982.3
  wall stippling 982.2
  whitewash 982.2
  window 982.3
  wire 982.3
Bucket wheels, turbine 706.2
Buckets, cloth 399.2
  fiber 951.63
  fire, fiber 951.63
  metal 951.64
  wooden 951.65
Buckeye grading rules (lumber) 400.39
Buckram 306.21
Buckwheat flour 102.2
Buckwheat grain 102.1
Buckwheat middlings 118.9
Buckwheat shorts 118.9
Buff pigments 842.84
Buffers, electric 711.24
Buffing wheels 765.
Buggies 727.
Bugles 925.1
Builders' hardware 617.
Builders' nails 608.11
Building codes 518.50
Building foundations 518.52
Building paper 473.
Building slate 511.52
Building steel, structural 605.12
Building tile, hollow 534.22
Building walls and partitions 518.53
Buildings, except steel 518.51
  industrial, steel 605.22
  public, lighting of 716.30
  school, code for lighting 716.30
  steel 605.22
Bulbs, absorption 918.9
  plant 251.
  potash 918.9
  rubber 204.91
Bulls 001.2
Bumper mountings, automobile 722.37
Bumpers, automobile 722.33
  interurban car 726.1
  rubber 203.91
Bungalow siding 411.1
Bunker oil 503.4
Bunting, cotton 306.41
  wool 306.42
Buoys, iron or steel 619.4
  life, kapok 349.5
Bureaus (furniture) 431.12
Burettes 918.1
Burglar alarms 718.31
Burial vaults, concrete 959.3
Burlap 322.1
Burlap bags 957.19
Burlap waste 390.5
Burners, laboratory 918.4
  oil, domestic 614.9
Burros 005.3
Buses, rules for inspection 723.0
Bushings, rubber 209.7
Butanol 822.2
Butcher saw 616.17
Butt hinges 617.12
Butter 022.1
  cacao (food product) 142.93
  cacao (medicinal) 813.8
  cocoa 142.93
  fruit 134.51
  peanut 135.5
  renovated 022.2
Butter cases, wooden 953.36
Butter cube, wooden 953.36
Butter substitute 022.3
Butterfat 021.8
Butterfat test scales 793.5
Buttermilk 021.3
Buttermilk feed, concentrated, condensed, dried, or evaporated 021.3
Butternut grading rules (lumber) 400.39
Butternuts 135.9
Buttons 992.
  door 617.9
  filler, porcelain, telephone switchboard 718.29
  push 718.33
Butts, jute 321.
Butyl acetate 839.9
Butyl alcohol 822.2
Butyl propionate 839.9
Buzzers 718.33
Byrkit lath 402.51

C

Cabbage, canned 125.1
  fresh 121.1
Cabbage seeds 245.
Cabinet locks 617.21
Cabinets, electrical 715.12
  filing, metal 613.7
    wooden 435.5
  flammable liquid storage 613.9
  hospital 915.43
  insulated against fire 613.5
  meter 715.12
  radio receiver 718.64
Cable, aluminum 715.41
  armored, electric 715.41
  automobile, lighting and starting 715.41
  communication 715.41
  copper, bare and insulated 715.41
  copper-nickel 654.54
  electric 715.41
  drilling, manila 332.
  hemp 332.
  insulated 715.41
  lead covered, electric 715.41
  messenger, steel 603.42
  mine, electric 715.41
  motion picture 715.41
  nickel-copper 654.54
  parkway, electric 715.41
  power, electric 715.41
  signal 715.41
  submarine 715.41
  telegraph 715.41
  telephone 715.41
  underground, electric 715.41
Cable drilling tools 754.
Cable reels 715.36
Cable supports, electric 719.61
Cacao beans 151.1
Cacao butter (food) 142.93
Cacao butter (medicinal) 813.8
Cade oil 813.9
Cadmium and cadmium products 634.
Cadmium chloride 839.39
Cadmium sulphate 839.39
Cadmium sulphide 839.39
Caffeine 811.
Cage, hammer throwing 943.94
Cajuput oil 813.9
Cakes (pastry) 108.2
Cakes, copper 641.11
  corn germ 112.9
  oil seed 112.
Calcimine 843.5
Calcimine brushes 982.2
Calcined gypsum 514.2
Calcium and calcium compounds 833.
Calcium acetate 833.9
Calcium arsenate 881.12
  medicinal 833.9
Calcium arsenite 881.12
Calcium bromide 833.9
Calcium carbide 833.1
Calcium carbonate 833.3
Calcium chloride 833.2
Calcium chloride for dust prevention 505.29
Calcium chloride tubes 918.9
Calcium cyanide 833.9
Calcium fluoride, medicinal 833.9
Calcium glycerophosphate 833.9
Calcium hydroxide 833.5
Calcium hypophosphite 833.9
Calcium iodide 833.9
Calcium iodobehenate 833.9
Calcium lactophosphate 833.9
Calcium lactate 833.9
Calcium molybdate 833.9
Calcium oxalate 833.9
Calcium oxide 833.5
Calcium phosphate 833.9
Calcium phosphide 833.4
Calcium sulphate 833.9
Calendar pads and stands 931.5
Calender, rubber mill 783.
Calf carcasses 011.8
Calfskins 051.
Calibration boxes for testing machines 919.9
Calico 306.11
Calipers, machinists' 615.81
Calking cotton 301.2
Calol ethatate 839.9
Calomel 839.36
Calves 001.2
Cambric 306.22
  varnished, electrical insulating 719.56
Cambric shade cloth 392.22
Camembert cheese 022.44
Cameras 911.1
Camp cots, folding 343.1

Camp furniture	433.
Camp stools	438.3
Camphor	212.
Candles	504.51
Candy	165.1
Cane sirup	164.4
Canella powder	819.1
Canisters, gas mask	993.
Canned meats, fruits, and vegetables. (*See* index for the individual meat, fruit, or vegetable.)	
Cannery cases	953.37
Cans	959.1
Cantaloupes, fresh	132.3
Canton fiber	330.
Canton flannel	304.2
Canvas. (*See under* Duck.)	
Canvas bedspring covers	315.6
Canvas cots	319.94
Canvas driving belts	314.1
Canvas packing	707.25
Cap insulators, trolley	719.63
Cap lamps, electric	716.17
Cap screws	608.2
Capers (spice)	154.41
Capping, cedar	402.9
concrete	516.9
wood	427.
Caps, clothing	395.1
fur	075.4
radiator and tank, automobile	722.33
Capacitors, electric	713.1
Capsules (laboratory apparatus)	918.9
Car dumping machines	789.
Car lighting	716.39
Car-retarder system, railway	718.42
Car steel, structural	605.13
Car stock lumber	413.2
cypress	413.29
fir and Douglas fir	413.21
hemlock	413.26
larch	413.29
mahogany	413.22
oak	413.23
pine	413.24
spruce	413.25
Car wheels, cast iron	611.18
cast steel	611.49
wrought steel	611.59
Caraway	154.52
Caraway extract	175.9
Caraway oil	813.9
Carbide, acetylene gas	833.1
silicon (abrasive cloth and paper)	541.4
Carbolic acid	802.1
Carbolineum	801.3
Carbon, powdered	575.1
Carbon black	842.4
Carbon brush shunts	715.49
Carbon brushes	711.42
Carbon dioxide	839.41
Carbon dioxide fire extinguishing systems	973.4
Carbon disulphide (fumigant)	881.32
Carbon disulphide (reagent and medicinal)	839.6
Carbon electrodes	575.2
Carbon paper	476.21
Carbon tetrachloride	839.7
Carbonated beverages	176., 177.
Carbonating equipment units	781.
Carboys	955.2
Carbureter, automobile	722.31
Carbureter throttle levers	722.38
Carburizing of gears and piston pins	600.5
Carcasses, beef	011.1
calf	011.8
lamb	014.1
mutton	014.3
pork	012.1
veal	011.8
Cardamom oil	813.9
Cardamom spice	154.51
Cardboard	474.
bristol	474.3
index bristol	474.2
manila	474.3
mill bristol	474.3
wedding bristol	474.4
Cardboard blanks	474.1
Cargo booms	725.41
Carpet lining	319.6
Carpet tacks	608.14
Carpets, woolen	366.2
Carriage bolts	608.31
Carriages	727.
Carriers, hospital	915.46
Carrots, canned	127.2
fresh	123.2
Carrying bags	957.3
Cars, box	726.1
fire	726.1
freight	726.1
log	726.1
mine haulage	726.1
post office, railway	726.1
rail motor	726.1

Cars, railway	726.
refrigerator, parts for	726.2
tank	726.1
test weight, railway	793.5
Cartons	954.1
Cartridge bag silk	373.24
Cartridge brass	644.21
Cartridge fuses	714.21
Cartridges, metallic	619.1
Carts	727.
Cascara sagrada, extract of	819.1
Casehardening steel	603.22
Casein glue	093.2
Casement adjusters	617.5
Casement fasteners	617.43
Casement sash, wooden	423.2
Cases, butter, wooden	953.36
cannery	953.37
cloth	399.3
egg, wooden	953.36
fiber	954.22
filing, wooden	435.5
honey	953.36
leather	069.7
mattress	315.14
metal	954.21
oil, wooden	953.36
paper	954.22
storage battery, wooden	954.29
watch	672.
Casing, sausage	094.
wood (interior trim)	411.42
Casing pipe, steel (oil well)	607.4
wrought iron (oil well)	607.3
Casket boxes	959.3
Caskets	959.3
Casks, metal	951.21
wooden	951.22
Cassia extract	175.2
Casseroles, laboratory	918.9
Cast iron, gray	611.11
malleable	611.21
Cast-iron commodities. (*See* index for the individual commodity desired.)	
Cast steel	611.41
Cast-steel commodities. (*See* index for the individual commodity desired.)	
Cast stone	516.4
Castile soap	871.11
Casting brush	982.3
Castings, alloy steel	622.5
aluminum and aluminum alloy	631.41
aluminum-bronze	647.15
bearing metal	692.
brass	645.21
bronze	646.41
copper	642.21
copper-nickel	654.51
die, zinc base	683.41
German silver	655.3
iron, gray	611.1
malleable	611.2
lead	651.3
magnesium alloy	695.
manganese bronze	647.26
Monel metal	654.51
naval brass	645.21
nickel-bronze	655.3
nickel-copper	654.51
nickel-copper-zinc alloy	655.3
nickel-silver	655.3
ounce metal	645.21
phosphor bronze	647.34
steel	611.4
tin	681.3
Castle nuts	608.32
Castor oil, medicinal	813.1
nonmedicinal	142.2
Catch basins	518.65
Catches (builders' hardware)	617.42
Catchup	129.12
Catgut ligatures	915.56
Catheters, rubber	204.55
Cathodes, battery	712.5
nickel	653.1
Catsup	129.12
Cattle	001.
beef	001.2
slaughter	001.2
Cattle hides and skins, raw	051.
Cauliflower, fresh	121.1
Caulking cotton	301.2
Caustic lime	517.2
Caustic potash	832.3
Caustic soda	834.8
Caustic washes for borers	881.4
Caviar	039.1
Cayenne pepper	154.23
Cedar grading rules	400.21
Ceiling lumber	411.3
Ceiling plates, brass (plumbing)	645.4
cast iron (plumbing)	611.19
cast steel (plumbing)	611.49
Ceilings, sheet metal	605.22

- Ceilings for buildings 518.57
- Celanese 397.
- Celery, canned 128.2
  - fresh 124.2
- Celery seed (spice) 154.32
- Celery seed extract 175.9
- Cells, storage battery. (*See* Jars, battery.)
- Cellulose acetate products 846.5
- Cellulose nitrate products 846.5
- Cement, asbestos 545.3
  - asphalt 505.13
  - dental 915.10
  - hydraulic 516.19
  - Keene's 514.63
  - magnesia 572.
  - masonry 516.19
  - natural 516.12
  - Portland 516.11
  - Puzzolan 516.19
  - rubber 204.92
  - sand 516.19
  - silica 516.19
  - tar 505.35
- Cement bags, paper 957.2
- Cement grout pavement filler 516.9
- Cement plant machinery 782.
- Cement rubble masonry 518.82
- Cement sack fabric 303.3
- Cement sacks, Osnaburg 957.19
  - paper 957.2
- Cement test sieves 645.31
- Center plates, railway car 605.13
- Centrifugal pumps 755.1
- Centrifuge tubes 918.9
- Ceramic mosaic 534.25
- Ceramic whiting 546.
- Cereal hay 111.2
- Cereals (breakfast foods) 109.3–109.6
- Cereals and cereal products 100–109
- Cerium oxalate 839.39
- Chafer tire fabrics 303.8
- Chain, anchor, stud link 603.53
  - close-link coil 603.52
  - construction 603.52
  - conveyor 766.1
  - crane 603.52
  - iron 603.52
  - jack, weldless 603.56
  - ladder, weldless 603.56
  - lock link, weldless 603.56
  - long link 603.51
  - marine, short link 603.52
  - mechanical communication 603.56
  - plumbers', copper 642.9
  - power transmission 766.1
  - proof coil 603.52
  - register 603.56
  - roller 766.1
  - safety, aluminum 603.56
    - brass 603.56
  - sash 603.56
  - short link 603.52
  - silent 766.1
  - stud link 603.53
  - transom 617.5
  - twisted link 603.54
  - vehicle 603.55
  - weldless, aluminum 631.9
    - copper 642.9
    - steel and iron 603.56
- Chain attachments 603.57
- Chain bolts 617.61
- Chain dogs 603.57
- Chain hooks 603.57
- Chain links and rings 603.57
- Chain plates, cast steel (marine) 611.49
- Chain shackles 603.57
- Chain sling 603.52
- Chain stay, brass (plumbing) 645.4
- Chain swivels 603.57
- Chain toggles 603.57
- Chairs, dining room 438.1
  - folding 438.3
  - metal 613.3
  - office, wooden 435.2
  - typewriter, wooden 435.2
  - wheel 438.4
  - wooden 438.
- Chalk 546.
  - blackboard 937.1
- Chalk and opium powder, aromatic 819.1
- Chalk line 302.42
- Chalk powder, aromatic 819.1
  - compound 819.1
- Chambray 306.12
- Chamois skin 061.7
- Channel pins 718.49
- Charcoal 501.6
- Charcoal pig iron 601.21
- Chard, canned 125.9
- Charging plug and receptacle 715.21
- Chart paper 478.31
- Charts 482.
- Chasers, die-head 765.
- Chaulmoogra oil 813.9
- Check valves 607.6
- Checks (cotton dress goods) 306.13
- Checks, door 617.41
  - restaurant 489.
- Cheddar cheese 022.45
- Cheese, American 022.45
  - Camembert 022.44
  - cheddar 022.45
  - cottage 022.49
  - edam 022.43
  - emulsified 022.49
  - full cream 022.42
  - pasteurized 022.49
  - schmierkase 022.49
  - skimmed milk 022.49
  - whole milk 022.41
- Cheese machinery 731.
- Cheesecloth 304.3
- Chemical charges for fire extinguishers 973.3
- Chemical fire engines 973.1
- Chemical fire extinguishers, hand 973.2
  - motorized 973.1
- Chemical hose 202.21
- Chemical plant equipment 782.
- Chemical thermometers 919.82
- Chemicals 800–899
- Chenopodium oil 813.9
- Cherries, canned 134.42
  - dried 133.42
  - fresh 132.42
- Cherry grading rules (lumber) 400.39
- Chest locks 617.21
- Chestnut grading rules (lumber) 400.39
- Chestnuts 135.2
- Chests, engineers' 958.1
  - medicine 915.43
  - tool 958.2
- Chevrons 369.6
- Chewing gum 165.2
- Chewing tobacco 262.3
- Chicken, preserved or cooked 018.4
- Chickens, killed 015.1
  - live 007.1
- Chicle 213.
- Chicory, fresh 121.3
- Chiffoniers 431.12
- Chili pepper 154.23
- Chili sauce 129.13
- Chimneys, lamp 524.
- Chimneys for buildings 518.55
- China (alkaloid) 811.
- China clay 531.2
- China wood oil 848.2
- Chinaware, table 532.1
- Chinese blue (pigment) 842.2
- Chip board (plain, tack board, test) 472.31
- Chip board, jute lined and manila lined 472.11
  - pasted 472.21
  - sheet lined 472.22
- Chips, soap 871.22
- Chisel bars 616.91
- Chisels, metal working 615.11
  - track 616.8
  - woodworking 616.13
- Chlorinated lime 833.2
- Chloride of lime 833.2
- Chloride of lime bleach 891.
- Chlorinators (biological apparatus) 918.84
- Chlorine 839.44
  - liquid 839.8
- Chloroform 815.2
- Chocks, ship 725.41
- Chocolate, powdered or prepared 151.3
- Chocolate candy 165.1
- Choke coils 713.6
  - line protecting 715.50
- Chops, corn 119.2
- Chow-chow (pickles) 129.11
- Christmas-tree lighting 716.39
- Chrome green (pigment) 842.5
- Chrome ores 621.11
- Chrome oxide green (pigment) 842.5
- Chrome tanned leather, test methods 060.
- Chrome tanning materials 231.
- Chrome yellow (pigment) 842.5
- Chromic acid 821.9
- Chromium compounds 837.
- Chromium pigments 842.5
- Chromium plating 600.3
- Chromium potassium sulphate 837.1
- Chromium trioxide 837.2
- Church furniture, wooden 437.
- Cider 179.
- Cigar box lumber 413.9
- Cigars 262.2
- Cigarette paper 476.22
- Cigarettes 262.1
- Cinchona 811.
- Cinchonidine 811.
- Cinchonine 811.
- Cinchonine sulphate 811.
- Cinnamic aldehyde 824.
- Cinnamon 154.11
- Cinnamon extract 175.9
- Cinnamon oil 813.9

- Circuit breakers 714.51
- Circular saw 616.17
- Citric acid 821.9
- Citron, dried 131.21
- Citrus fruits 131.2
- Clam juice 039.3
- Clamps, body hold-down, motor truck 722.1
  - ground (electric) 719.72
  - guy 719.62
    - malleable iron 611.29
    - steel 619.9
  - hose, steel 607.4
  - laboratory 918.4
  - messenger 719.62
  - vise 615.43
- Clams, fresh 036.2
- Claw bars 616.91
- Clay 531.
  - ball 531.1
  - china 531.2
  - fire 531.3
- Clay products (rapid reference). (*See* index for individual commodities made of clay.)
- Clay-working machinery 782.
- Cleaner, phosphate 871.23
- Cleaning brushes 982.3
- Cleaning machinery, coal 789.
- Clean-out plug, brass (plumbing) 645.4
- Clear window glass 521.2
- Cleats, mooring, for docks 611.49
- Cleats, mooring, for ships 725.41
- Cleats, porcelain (electrical) 532.22
- Clevis (pole line hardware) 719.62
- Clevis, wire rope 603.42
- Climax baskets, for grapes 952.11
- Clinch ears, trolley 719.63
- Clinical thermometers 919.83
- Clips, cable and conduit 719.72
  - fuse 714.22
  - guy 719.62
  - paper 932.5
- Clocks 671.
- Clocks (electric time-clock systems) 718.35
- Closers, door 617.41
- Closet lining, cedar 411.9
- Cloth, abrasive 541.4
  - asbestos 545.4
  - awning 303.6
  - beaver 365.11
  - billiard 365.91
  - blue print 392.12
  - book 392.2
  - convalescent 308.6
  - cotton, bleached and unbleached 304.1–304.9
    - printed, dyed, colored, or woven figured 306.1–306.4
  - cotton duck 303.1–303.9
  - diaper 308.5
  - doeskin 365.14
  - emery 541.4
  - enameled 392.11
  - facing, woolen 365.95
  - fearnaught 365.15
  - hair 365.96
  - hemp 334.
  - linen 333.
  - momie 308.7
  - oil 392.6
  - polishing 319.4
  - press, hair 365.96
  - process 308.8
  - ramie 334.
  - rubber 204.32
  - scrub 319.5
  - shade 392.22
  - silence (table) 316.3
  - silk 373.2
  - table 316.1
  - tracing 392.12
  - tray, cotton 316.4
  - varnished 392.13
  - waterproof 392.4
  - wire, brass 645.39
    - bronze 646.52
    - copper 642.4
    - Fourdrinier 645.39
    - iron and steel 603.43
  - woolen 365.1–365.9
- Cloth bags and sacks 957.1
- Cloth basins 399.2
- Cloth buckets 399.2
- Cloth cases 399.3
- Clothes dryers, gas 997.2
- Clothes hanger bar 617.9
- Clothes line pulley 617.9
- Clothes scrubbing brush 982.3
- Clothing, athletic 943.91
  - cotton 309–312
  - leather 069.4
  - linen 335.
  - oiled 392.53
  - rain 392.51–392.54
  - rayon 397.1
  - rubber 203.
  - silk 375.
- Clothing, waterproof 392.5
  - woolen 367., 368.
  - work, cotton 311.3
- Clothing duck 303.2
- Clothing hampers 952.2
- Clothing hooks 617.63
- Clove extract 175.9
- Clove oil 813.9
- Clover hay 111.4
- Clover seeds 241.
- Cloves 154.42
- Clutch facings, automobile 722.34
- Clutch housing, automobile 722.31
  - tractor 729.5
- Coaches, horse drawn 727.
- Coal, anthracite 501.1
  - bituminous 501.2
  - semibituminous 501.3
- Coal baskets 952.13
- Coal-cleaning machinery 789.
- Coal hods 951.64
- Coal-mine ventilation safety code 750.
- Coal mines, rock dusting in 599.
- Coal stoves 614.1
- Coal-tar acids 802.1
- Coal-tar colors 803.1
- Coal-tar distillate oil 801.3
- Coal-tar dyes 803.1
- Coal-tar food colors 803.13
- Coal-tar medicinals 803.2
- Coal-tar paving oil 801.3
- Coal-tar pitch for stone block filler 505.39
- Coal-tar products, crude 801.
- Coal-tar stains 803.1
- Coarse aggregate 512.14
- Coat hooks 617.63
- Coated fabrics 392.1
- Coating, lead 600.3
  - tin 600.3, 604.31
  - zinc 600.3
- Coating paper 475.73
- Coats, cotton 311.1
  - oilskin 392.53
  - woolen 368.2
- Cobalt 635.
- Cobalt compounds and salts 839.32
- Cobalt metal, medicinal 839.32
- Cobblers' nails 608.11
- Cobblers' tacks 608.14
- Cobs, wooden, for insulator pins 719.62
- Cocaine 811.
- Cocaine hydrochloride 811.
- Cocks 607.6
- Cocoa 15.1
  - powdered or prepared 151.2
- Cocoa beans 151.1
- Cocoa butter 142.93
- Cocoa pulverizing systems 789.
- Coconut, shredded 135.3
- Coconut meal 112.4
- Coconut oil 142.1
- Coconut oil cake 112.4
- Coconuts 135.3
- Cod-liver oil 813.2
- Cod oil 042.1
- Code ball 209.91
- Codeine 811.
- Codeine phosphate 811.
- Codeine sulphate 811.
- Codfish, canned 035.1
  - dry cured 034.2
  - fresh 031.1
- Coffee 152.1, 152.2
- Coffee extract 152.3
- Coffee substitutes 152.3
- Cofferdams 518.77
- Coils, choke 713.6
    - line protecting 715.50
  - heat 714.21
  - ignition 713.6
  - inductance, radio 718.65
- Coke 501.5
- Colchicine 811.
- Colchicum extract powder 819.1
- Collars, flax or linen 335.
- Collectors, current, trolley 719.63
- Collodion 846.5
- Colocynth extract 819.1
- Colon tubes, rubber 204.54
- Color card; hosiery 309.2
  - paint 840.4
  - textile 306.0
- Color code for cotton yarn sizes 302.10
- Color comparison tubes 918.9
- Color distribution curves, primary 914.0
- Color lakes 803.12
- Color system, lovibond 914.6
- Colored thread, polished (cotton) 302.24
- Coloring of fruit, safe practice for 518.59
- Coloring solution, glove 849.9
- Colors, coal tar 803.1
  - food, coal tar 803.13
  - traffic signal 718.5
- Column bases, cast iron 161.19

Columns, building, concrete 518.58
  cast iron 611.19
  porch, turned 411.9
Colza oil 142.8
Combination board, paper 472.1
Combustion tubes and boats 918.9
Commercial forms 489.
Commercial writing paper 478.1
Commodes, hospital 915.47
Common boards 402.42
Common brick 534.11
Communication cable 715.41
Compass saw 616.17
Compasses 919.3
  radio 718.66
Composition books 481.
Composition brass castings 645.21
Compressed cork 425.2
Compressed-gas cylinders 958.1
Compressed-gas systems for lighting and heating 997.2
Compresses, surgical 398.32
Compression stops (valves) 607.6
Compressors 791.2
Computing-machine ribbons 932.2
Computing scales 739.5
Concentrated buttermilk feed 021.3
Concentrated milk 021.4
Concentrates, fruit 178.0
Concrete 516.3
Concrete architectural stone 516.4
Concrete building forms 518.50
Concrete form lumber, end matched 411.9
Concrete foundation for roads 518.21
Concrete-lined shafts 518.9
Concrete masonry 518.89
Concrete mixers 742.
Concrete pavements 518.31
Concrete products and structural units. (*See* index for individual commodity or structural unit.)
Concrete sidewalk 516.5
Condensed buttermilk (feeding stuff) 021.3
Condensed milk 021.5
Condensed skimmed milk (feeding stuff) 021.9
Condenser tube packing, metallic 707.23
Condenser tubes, admiralty metal 645.24
  brass 645.24
  glass (laboratory) 918.9
  Muntz metal 645.24
Condensers, electric, static 713.1
  laboratory 918.9
  steam boiler 703.9
  synchronous 713.2
Conductor pipe (eaves), sheet metal 607.5
Conductors, electrical. (*See* Wire, cable, cord (electrical).)
Conduit, clay 531.5
  creosoted wood 427.
  electric 715.11
  flexible steel 607.7
Conduit castings 611.12
Conduit construction, underground 518.9
Conduit ferrules 715.11
Cone colors for cotton yarn 302.10
Cone insulators, trolley 719.63
Confectionery 165.
Congo red (biological stain) 803.19
Congo red (dye) 803.10
Connecting-rod bolts, alloy steel 622.1
  automobile 722.33
Connection boxes, electrical 715.12
Connectors, cable and wire 719.72
  track circuit 718.49
  train line 715.21
Construction machinery 740–749
Construction of bridges 518.4
Construction work 518.
Containers 950–959
  glass 955.
  surgical dressing 959.5
Control equipment, aircraft 724.25
  automobile 722.38
  electrical 714.1
Control-lever handle balls, automobile 722.34
Control positions, automobile 722.34
Controllers, electric 714.11
  railway switch circuit 718.42
Controls, motor boat 725.3
Convalescent cloth 308.6
Conversion tables for area and volume 919.1
Converters, frequency 713.2
  rotary (electrical) 713.2
  synchronous 713.2
Conveyor belting, cotton 314.3
  rubber 207.1
Conveyor chains 766.1
Conveyors 745.1
Cookers, starch, laundry 787.
Cooking devices, electric 717.1
Cooking equipment, acetylene 614.9
Cooking stove, coal 614.1
  gas 614.2
  gasoline 614.3
  oil 614.3
Cooks' caps 395.11
Coolers, water 955.6
Cooling cans 959.1
Cooperage 421.
Cooperage stock lumber 413.7
Coopers' rivets 608.4
Coping, wall, clay 534.24
Coping wheels 541.3
Copper, manganese (alloy) 643.1
  phosphor (alloy) 643.2
  silicon (alloy) 643.3
Copper alloys 643.
Copper bearing metals 692.2
Copper bronze powder 847.3
Copper carbonate (fungicide) 881.9
Copper compounds and salts 839.33
Copper metal, medicinal 839.33
Copper-nickel alloy 654.
Copper-nickel-zinc alloy 655.
Copper-tin-zinc alloy 643.4
Copper products 641.
Copper products (rapid reference). (*See* index for individual commodities made of copper.)
Coppers, gravity battery 712.5
  soldering 615.71
Coppersmiths' tools 615.7
Copra meal 112.4
Copra oil 142.1
Copying ink 933.1
Copying tissue 476.1
Cord, armored, electric 715.42
  bell, cotton 302.41
  cotton 302.4
  elastic 394.5
  electric 715.42
  electric iron 715.42
  flax 331.14
  flexible, electric 715.42
  heater 715.42
  insulated 715.42
  lacing, cotton 302.45
  lamp 715.42
  rubber sheathed, electric 715.42
  sash 302.46
  signal, cotton 302.41
  silk 379.1
  switchboard 715.42
  telephone 715.42
  tire, cotton 302.49
    woven 303.8
  woolen 369.1
  wrapping, cotton 302.47
Cord tip, telephone receiver 715.35
Cordage, cotton 302.4
  hemp 331.16
  jute 325.1
  ramie 331.13
Cordage for line-carrying guns 619.1
Corduroys 308.2
Cordwood 401.6
Core drill fittings, diamond 741.3
Coriander oil 813.9
Coriander seed 154.33
Cork, compressed 425.2
  ground 414.1
Cork board 425.2
Cork gaskets 707.14
Cork life preservers 425.3
Cork pipe coverings 707.41
Cork stoppers 425.1
Corn (grain) 103.1
Corn, broom 294.
  canned 126.2
  sweet ear, in husks 122.2
Corn bran 118.2
Corn breakfast foods 109.3
Corn brooms 981.1
Corn chops 119.2
Corn cribbing, fir 411.9
Corn flakes 109.3
Corn flour 103.2
Corn germ cake 112.9
Corn germ meal 112.9
Corn gluten feed 103.4
Corn gluten meal 103.4
Corn grits 119.2
Corn meal 103.4
Corn oil 142.3
Corn-oil cake 112.9
Corn-oil meal 112.9
Corn sirup 164.2
Corn solubles 119.4
Corn sugar 161.4
Corned beef, canned 018.12
Corned-beef hash 018.15
Corned veal 018.12
Cornices, sheet metal 605.22
Cornstarch 103.3
Corrugated ironwork on buildings 605.22
Corrugated metal sheets for culverts 604.29
Corrugated paper-board boxes 953.2
Corrugated strawboard 472.25
Cosmetics, soaps, and toilet preparations 870–879
Cotarnine chloride 811.

Cots, camp, folding 433. 1
canvas 319. 94
finger, rubber 204. 52
metal 613. 1
wooden 431. 13
Cottage cheese 022. 49
Cotter keys 608. 51
Cotter pins 608. 51
Cotton 300–309
absorbent 398. 1
American Egyptian 300. 1
American upland 300. 1
calking 301. 2
long staple 300. 1
short staple 300. 1
smokeless powder 301. 6
United States standards for grades of 300.
upland 300. 1
Cotton batting 319. 1
Cotton cloth, bleached and unbleached 304. 1–304. 9
printed, dyed, colored, or woven figured 306. 1–306. 4
Cotton duck 303. 1–303. 9
Cotton fabrics 303. –309.
Cotton fabrics (rapid reference). (*See* index for the individual fabric.)
Cotton linters 301. 3
Cotton manufactures (rapid reference). (*See* index for the individual commodity desired.)
Cotton manufacturing machinery 772.
Cotton mattress filling 301. 4
Cotton wadding 319. 1
Cottonade 306. 31
Cottonseed 141.
Cottonseed feed 117. 1
Cottonseed meal 112. 3
Cottonseed oil 142. 4
medicinal 813. 3
Cottonseed-oil cake 112. 3
Cottonwood grading rules 400. 39
Counter duster 982. 3
Counter scales 793. 5
Counterpanes, cotton 315. 4
Counters, operation and speed 793. 1
Coupés, automobile 723. 11
Coupler yokes, railway car 605. 13, 726. 2
Couplers, railway 611. 44
Couplings, air brake hose 202. 11
cast-iron pipe 607. 14
fire hose 974. 2
locomotive injector 702. 9
malleable-iron pipe 607. 2
propeller shaft, marine 725. 3
shaft, flexible disk, automobile 722. 34
ship 725. 42
steam hose 202. 44
steel pipe 607. 4
water hose 202. 42, 974. 2
wrought-iron pipe 607. 3
Cover, bed spring 315. 6
cushion 399. 5
mattress 315. 14
storage battery, hard rubber 205. 1
Cover glasses 526. 3
Cover paper, coated 475. 1
pasted 475. 2
uncoated 475. 3
Coverings for freight shipments 959. 6
Cowhide, leather 065. 1
raw 051.
Cows, milk 001. 1
slaughter 001. 2
Crab meal 098. 1
Crab meat, canned 037. 2
fresh 036. 3
Crackers 108. 3
Cranberries, canned 134. 11
fresh 132. 11
Cranberry boxes, wooden 953. 34
Crane chain 603. 52
Crane motors, alternating current 711. 21
direct current 711. 22
Cranes 744. 1
Crank pins, locomotive 702. 9
Crank-case oil 504. 34
Cranks, starting, automobile 722. 31
Crash toweling, cotton 304. 91
linen 333. 3
Crash towels, cotton 319. 3
linen 339. 51
Crate lumber 402. 42
Crates, basket, fruit and vegetable 934. 35
berry 954. 32
fruit 954. 31
shipping (packing crates) 954. 36
vegetable 954. 33
Cravats, silk 375. 1
Crayon holders 931. 2
Crayons 931. 1
Cream 021. 2
Cream bottles 955. 1
Cream cheese 022. 42
Cream machinery 731.
Cream of tartar 155. 3
Cream pigments 842. 88
Cream test scales 793. 5
Cremone bolts 617. 61
Creosote 801. 3
Creosote carbonate 803. 23
Creosote coal-tar solution 801. 3
Creosote oil 801. 3
Creosote treatment of lumber 400. 4
Crêpe, silk 372. 0
Cresol 803. 24
Cresyl, commercial 803. 4
medicinal 803. 19
Cribbing, concrete 516. 4
corn, fir 411. 9
timber 412. 1
Crinoline 306. 21
Crockery 533. 2
Crocus cloth 541. 4
Cross-arm bolts 719. 62
Cross-arm braces 719. 62
Cross-arm gages 615. 82
Cross-arm pins, steel 719. 61
wooden 429. 7
Cross arms, metallic 719. 62
wood 402. 1
Cross connecting ring (pole line hardware) 719. 61
Cross-section cloth (tracing cloth) 392. 12
Cross-section paper 478. 35
Crosscut saw 616. 17
Crossties, railroad 401. 1
Crosse, lacrosse 943. 95
Crosses, cast-iron pipe 607. 14
malleable-iron pipe 607. 2
Crossheads, locomotive 702. 9
Crossing signs, highway 998.
Crossings, line wires over railway 719. 60
railroad, bolted, alloy steel 622. 9
cast alloy steel 622. 5
railway track, carbon steel 606. 3
trolley 719. 63
Croton oil, medicinal 813. 9
Crowbars 616. 91
Crucibles, laboratory 918. 3
plumbago 574.
porcelain 532. 21
Crude petroleum 502. 1
Crude rubber 201. 1
Crushed stone 512. 15
Cryolite 591.
Crystal violet (biological stain) 803. 19
Cube, butter, wooden 953. 36
Cubes, nickel 653. 1
Cucumber pickles 129. 11
Cucumbers, canned 126. 3
fresh 122. 3
Cuffs, flax or linen 335.
Cultivators 732.
Culvert pipe, corrugated sheet metal 607. 5
reinforced concrete 518. 61
Culverts, cast-iron pipe 607. 11
concrete 518. 61
wooden 412. 2
Cumin seed 154. 34
Cup grease 504. 41
Cupboard, clothing, metal 613. 5
stationery, metal 613. 5
Cupboard, bolts 617. 61
Cupboard catches 617. 42
Cupboard locks 617. 21
Cupboard sash, wooden 423. 2
Cupboard turns 617. 9
Cuprice acetate 839. 33
Cupric ammonium chloride 839. 33
Cupric arsenite, hydric 839. 33
Cupric carbonate 839. 33
Cupric oxide 839. 33
Cupric sulphate 839. 33
Cuprous chloride 839. 33
Cuprous oxide (pigment) 842. 9
Cups, grease 794.
hospital 915. 42
pin and sponge 932. 3
soap, brass 645. 4
Curbs 518. 63
Curcuma 154. 19
Curled horsehair 362. 1
Curled mattress hair 362. 2
Current collectors, trolley 719. 63
Curtains 319. 91
Curtains. (*See also* Window shades.)
Currants, canned 134. 12
dried 133. 12
fresh 132. 12
Curry 154. 9
Cushion covers 399. 5
Cushion tires 206. 5
Cushions 399. 5
hair 315. 35
rubber 204. 25
Cuspidor brush 982. 3
Cutlery 612. 1
kitchen 612. 14
table 612. 14
Cut-out bases 714. 22
Cut-out box, electrical 715. 12

- Cutters, ensilage 735.
  - glass 616.18
  - milling 765.
  - pipe 615.39
- Cutting oil 041.3, 504.7
- Cyclopean aggregate 512.14
- Cylinder collar, door lock 617.23
- Cylinder grease 504.42
- Cylinder heads, locomotive 702.9
- Cylinder oil 504.2
- Cylinders, compressed gas 956.1
  - graduated 918.2
  - steam locomotive 702.1
- Cypress grading rules 400.22

D

- Dairy buildings 518.51
- Dairy cloth 308.4
- Dairy machinery 731.
- Dairy products 020-029
- Dam, rubber, dental 204.4
- Damar varnish 846.12
- Damask, cotton 308.1
  - linen 333.4
- Dampeners, seam, laundry 787.
- Damp-proofing asphalt 505.16
- Damp-proofing tar 505.36
- Darso 103.5
- Dates, canned 134.43
  - dried 133.43
  - fresh 132.43
- Dating nails 608.11
- Dauber brushes 982.2
- Deals (lumber) 402.43
- Deck drains and strainers 725.41
- Deck scrubbing brush 982.3
- Decking, bridge 412.9
  - porch 411.9
  - wood (ship stock) 413.4
- Deed paper, parchment 478.16
- Demijohns 955.5
- Denatured alcohol 822.3
- Denim 306.31
- Dental amalgams 691.1
- Dental equipment and supplies 915.1
- Dental gold alloys 662.
- Dental impression compounds and inlay waxes 915.19
- Dental rubber goods 204.4
- Dentifrices 872.2
- Depressors, tongue 915.23
- Derrick foundations, concrete 518.9
- Derricks, oil well 754.
  - quarrying 751.
- Desiccators 918.9
- Desk locks 617.21
- Desk pads 931.5
- Desks, metal 613.4
  - wooden 435.3
- Detectors, gas, electric 716.17
  - nonelectric 997.6
- Developer, photographic 809.3
- Dewberries, fresh 132.11
- Dextrose 161.4
- Diabetic food 108.5
- Diacetylmorphine 811.
- Dial illuminating lamps 716.14
- Dials 673.
- Diamine red (dye) 803.10
- Diamond core-drill fittings 741.3
- Diamonds 561.
- Diaper cloth 308.5
- Diaphragm packing, rubber 707.24
- Diatomaceous earth 593.
- Dichloramine-T 803.21
- Die castings, aluminum base 631.41
  - zinc base 683.41
- Die-head chasers 765.
- Dies, punch 765.
  - thread cutting 615.15
- Diesel engines 704.1
- Differentials, automobile 722.34
- Digester tankage 098.1
- Diggers, potato 734.
- Dill pickles 129.11
- Dill seed 154.35
- Dimension gages 615.82
- Dimension lumber, furniture 413.53
  - yard 402.43
- Dimension timber, structural 412.1
- Dimethylaminoantipyrin 819.9
- Dining-room chairs 438.1
- Dining-room furniture 431.4
- Dip, coal-tar 803.4
- Dip tanks for painting 956.2
- Diphenylamine for smokeless powder 802.3
- Diphtheria toxins, antitoxins, and toxoids 812.
- Direct-current generators 711.12
- Direct-current motors 711.22
- Dirt roads 518.38
- Discharge devices, liquid measuring 793.6
- Disconnecting switches, electrical 714.52
- Discus 943.94
- Dish toweling, cotton 304.94
- Dish towels, cotton 319.3
  - linen 339.53
- Dishes, chinaware 532.1
  - glass 523.
  - laboratory 918.5
  - soap, brass 645.4
  - wooden 429.1
- Disinfectants 881.3-881.9
- Disinfectants, coal-tar 803.4
- Disinfectants for buildings 881.5
- Disinfectors 915.31
- Disk plows, harrows, drills, listers, and cultivators 732.
- Dispatcher's table, telegraph 613.6
- Distillates, petroleum 503.2
  - tar 505.37
- Distillation flasks 918.9
- Distilled liquors 171.
- Distillers' dried grains 119.4
- Distilling flask, Hempel 918.9
  - Saybolt 918.9
- Distilling tubes, laboratory 918.9
- Distributing frames, telephone 718.29
- Distribution apparatus, electrical 715.
- Distribution apparatus, electrical (for rapid reference). (*See* index under individual items desired.)
- Distribution panels and panel boards, electric 714.41
- Distributors, automobile 722.32
- Divers' hose 202.13
- Dividers, machinists' 615.81
- Diving apparatus 993.
- Document boxes, wooden 435.4
- Doeskin cloth 365.14
- Dogs, chain 603.57
- Dolomite 511.2
- Donkey engines 703.1
- Donkeys 005.2
- Door bolt locks 617.61
- Door buttons 617.9
- Door catches 617.42
- Door checks 617.41
- Door closers 617.41
- Door fasteners 617.43
- Door frames 423.9
- Door handles 617.32
  - automobile 722.37
- Door hinges 617.12
- Door holders 617.44
- Door hooks 617.63
- Door knobs 617.31
- Door latches 617.22
- Door locks 617.21
  - automobile 722.37
- Door lumber 413.8
- Door pulls 617.33
- Door rails, sliding door 617.9
- Door screens 423.1
- Door stops 617.44
- Doors, fire 605.22
  - hollow metal 605.22
  - industrial, steel 605.22
  - kalamein 605.22
  - railway car 726.2
  - steel 605.22
  - tin clad 605.22
  - wooden 423.1
- Dough mixers 786.
- Douglas-fir grading rules 400.23
- Dover's powder 819.1
- Dowel pins 608.51
- Dowlas linen 333.1
- Drab pigments 842.84
- Drafting ink 933.3
- Draftsmen's devices and supplies 935.
- Drain, deck 725.41
  - floor, cast iron 611.14
  - roof, cast iron 611.19
  - shower, brass 645.4
  - urinal, brass 645.4
- Drain and trap combined, brass 645.4
- Drain cocks 607.6
- Drain pipe, cast iron 607.11
  - clay 531.5, 534.21
  - concrete 518.62
- Drain strainer, deck 725.41
- Drain tile, clay 534.21
  - concrete 518.62
- Drainage structures 518.6
- Draw knives 616.15
- Drawer handles 617.32
- Drawer locks 617.21
- Drawer pulls 617.33
- Drawers, cotton, knit 309.4
    - woven 312.1
  - woolen, knit 367.2
    - woven 368.7
  - woolen and wool cotton 367.2
- Drawing board and paper, bristol 473.9
- Drawing ink 933.3
- Drawing instruments 935.
- Drawing knives 616.15
- Drawing paper 478.32
- Dredging machinery 741.5
- Dredging sleeves, rubber 209.1
- Dress caps 395.13

Dress gloves 068.3
Dress material, cotton 306.1
Dress patterns 311.2
Dressed and matched yard lumber 411.6
Dresses, cotton 311.2
Dressing, salad 129.14
Dressing containers, surgical 959.5
Dressings, gauze 398.34
  leather 891.
  surgical 398.1–398.3
Dried beef, canned 018.13
Dried buttermilk feed 021.3
Dried fish 034.
Dried fruit boxes 953.31
Dried fruits 133.
Dried fruits (rapid reference). (*See* index for individual fruit.)
Dried grains, brewers' and distillers' 119.4
Dried milk 021.7
Dried skimmed milk (feeding stuff) 021.9
Dried veal 018.13
Driers, japan 849.11
  paint 849.1
Drill, cotton 304.4
Drill fittings, core, diamond 741.3
Drill pipe, steel 607.4
  wrought iron 607.3
Drill-pipe joint threads 607.0
Drill tool steel bars and rods 603.31
Drilling cable, manila 332.
Drilling machines 741.3
Drilling tools, oil well 754.
Drills, agricultural 732.
  breast 615.12
  electric 711.24
  hand, metal working 615.12
  twist, metal working 615.12
  woodworkers' 616.14
Drinking water 882.3
Drinking fountains, sanitary 532.23
Driveway, concrete 516.5
Driving journal grease 504.46
Driving point (pole-line hardware) 719.62
Drop siding (lumber) 411.1
Droppers, medicine 915.45
Druggists' rubber sundries 204.
Druggists' scales and balances 793.5
Drums, fiber 951.31
  metal 951.32
  wooden 951.33
Dry beans 126.11
Dry-cell batteries 712.1
Dry-cleaning and dry-dyeing plants 787.
Dry-cleaning soap 871.7
Dry-cleaning solvent 503.2
Dry measures 919.1
Dry peas 126.13
Dry pipe valves, sprinkler 607.6
Dry pipes, locomotive 702.9
Dry pork 012.92
Dry rubble masonry 518.81
Dry skim milk 021.7
Dryers, clothes, gas 997.2
Drying tumblers, laundry 787.
Duck, Army, gray 303.1
  awning 303.6
  bag 303.3
  belt 303.97
  clothing 303.2
  cotton 303.1–303.9
  enameled 303.93
  hose 303.97
  lining 303.4
  mattress cover and cot 303.7
  mode 303.91
  rubberized 303.94
  tent 303.5
  tire 303.8
  waterproof 303.95
  white union 303.2
Ducks, killed 015.2
  live 007.3
Duct, fiber 715.11
  tile 715.11
Dulcin 839.9
Dumb-waiters 745.2
Dump bins and hoppers 959.7
Dump bodies, motor truck 722.1
Dumping-hoist platforms, motor truck 722.1
Duplicating paper 478.2
Duralumin products (rapid reference). (*See* index for individual commodities made of aluminum alloy.)
Durra 103.5
Dust brush 982.3
Dust for rock-dusting coal mines 511.9
Dust pan 612.29
Duster, counter 982.3
  feather 092.2
  painters' 982.3
Dusting brush, radiator 982.3
Dusting powders (insecticides) 881.17
Dwellings 518.51
  lighting of 716.30
Dyeing extracts, vegetable 233.
Dyeing materials, vegetable 232.
Dyeing plants 787.
Dyes, classification of 803.10
  coal tar 803.1
Dyestuffs, fastness tests 300.4
Dynamite 862.
Dynamotors 713.3

E

Ear cushions, rubber 208.92
Ears, trolley 719.63
Earth, diatomaceous and infusorial 593.
Earthenware 533.
Eave spouting (brass down-spout nozzle) 645.4
Eave spouting, sheet metal 607.5
Eave trough, sheet metal 607.5
Edam cheese 022.43
Edge tools 616.1
Educational supplies 937.
Effervescing powder 819.1
Egg cases, wooden 953.36
Egg noodles 103.42
Eggplant, canned 126.4
  fresh 122.4
Eggs 019.
Elastic board (spring board) 429.9
Elastic cord 394.5
Elastic shoe goring 394.5
Elastic webbing 394.5
Elbow catches 617.42
Elbows. (*See also* Ells.)
Elbows, eaves pipe, sheet metal 607.5
Electrical code 715.30
Electrical machinery and supplies 710–719
Electrical machinery and supplies (rapid reference). (*See* index for individual machine or supply items).
Electrical safety code 710.
Electrical symbols 710.
Electro-acoustic devices, radio 718.69
Electrodes, carbon 575.2
  welding 603.26
Electrolyte, battery 712.4
Electrolytic copper bars 641.11
Electron tubes 718.62
Electroplating apparatus 712.
Electrotype backing metal 651.6
Electrotypes 788.
Elevator belting 207.2
Elevator door locks 617.21
Elevator motors, alternating current 711.21
  direct current 711.22
Elevator safety code 745.3
Elevators 745.3
Elk leather 061.1
Ells, cast-iron pipe 607.14
  malleable-iron pipe 607.2
  sheet-metal pipe 607.5
  steel pipe 607.4
  wrought-iron pipe 607.3
Elm grading rules 400.39
Embankment construction, roadway 518.12
Embroideries, silk 378.
Embroidery silk 372.2
Emergency signals, railway 863.
Emery cloth 541.4
Emetine hydrochloride 811.
Emulsified cheese 022.49
Enamel 843.3
  black 843.31
  brown 843.32
  cream 843.33
  gray 843.31
  green 843.34
  maroon 843.36
  olive 843.35
  red 843.36
  white 843.37
  yellow 843.38
Enamel for enamelware 531.6
Enamel paint 843.3
Enameled cloth 392.11
Enameled ironware 612.2
Enameled leather 062.
Enclosed fuses. (*See* Inclosed fuses.)
Enclosed switches, electrical. (*See* Inclosed switches.)
Enclosures. (*See* Inclosures.)
Endive, canned 125.3
  fresh 121.3
Engine accessories and parts, gasoline 705.5
  steam 702.
Engine bolt iron 603.1
Engine-starter mounting, aeronautic 724.21
Engine support arms, automobile 722.31
Engine trunnions, automobile 722.31
Engineers' chests and kits 958.1
Engineers' instruments and supplies 916.
Engines, airplane 705.6
  automobile 705.1
  Diesel 704.1
  donkey 703.1
  fire, automobile 722.2
  fire, chemical 973.1
  fire pump, gasoline 705.3
  gas 705.

Engines, gasoline, airplane 705.6
    automobile 705.1
    electric generator 705.4
    motor boat 705.2
    pumping 705.3
    ship propulsion 705.7
  motor boat 705.2
  oil 704.1
  pumping, gas and gasoline 705.3
  steam, reciprocating 701.1
    rotary 701.2
Engler flask 918.9
Engler viscosimeter 919.9
Engravers' devices and supplies 935.
Ensilage cutters 735.
Envelope paper 478.19
Envelopes 494.
Eosin B (biological stain) 803.19
Eosin Y (dye) 803.19
Ephedrine 811.
Eradicators, ink 931.4
Erasers, blackboard 937.2
  ink and pencil 931.4
  rubber 204.93
Ergot 811.
Erlenmeyer flasks 918.9
Erythrosine (food dye) 803.13
Escarole, fresh 121.3
Escutcheons, door lock 617.23
Espagnolette bolts 617.61
Ester gum 846.61
Ethanol 822.3
Ether 815.1
  acetic 839.9
  petroleum 503.1
Ethyl acetate 839.9
Ethyl alcohol, denatured 822.3
  pure grain 822.4
Ethyl aminobenzoate 839.9
Ethyl chaulmoograte 839.9
Ethyl chloride 839.9
Ethyl lactate 839.9
Ethylmorphine hydrochloride 811.
Eucalyptus oil 813.9
Evaporated buttermilk feed 021.3
Evaporated fruits 133.
Evaporated fruits (rapid reference). (*See* Index for the individual fruit.)
Evaporated milk 021.6
Evaporators, boiler plant 703.9
Eveners, wagon 413.54
Evergreens (nursery stock) 259.
Ewes 003.
Excavating machinery 741.
Excavation for roadways 518.12
Expansion bolt 608.31
Expansion joints, premolded (paving) 505.15
  rubber 208.93
Explosion, dust, prevention of 750., 789.
Explosion-proof controllers 714.11
Explosion-proof fuses 714.21
Explosion-proof meters, electric 714.30
Explosion-proof motors, electric 711.25
Explosion-proof receptacles and plugs 715.21
Explosion-proof resistors 714.12
Explosion-proof storage batteries 712.2
Explosion-proof switch and junction boxes 715.12
Explosion-proof switches, electrical 714.52
Explosives 860–869
Explosives (coal-tar base) 803.3
Extinguishers, fire, chemical, hand 973.2
    motorized 973.1
Extract, allspice 175.9
  almond 175.1
  anise 175.9
  beef 099.1
    medicinal 819.4
  belladonna 819.1
  caraway 175.9
  cascara sagrada 819.1
  cassia 175.2
  celery seed 175.9
  cinnamon 175.9
  clove 175.9
  colchicum 819.1
  colocynth 819.1
  ginger 175.9
  hyoscyamus 819.1
  kummel 175.9
  lemon 175.6
  nutmeg 175.9
  nux vomica 819.1
  orange 175.7
  oxgall 819.1
  peppermint 175.3
  ragweed pollen 819.9
  rhubarb 819.1
  rose 175.9
  savory 175.9
  spearmint 175.9
  star anise 175.9
  stramonium 819.1
  sweet basil 175.9
  sweet marjoram 175.9
Extract, thyme 175.9
  tonka 175.9
  vanilla 175.4
  wintergreen 175.5
Extraction apparatus, laboratory 918.9
Extractors, laundry 787.
Extracts, dyeing, vegetable 233.
  flavoring 175.
  tanning 234.
Eye nuts, wire rope 603.42
Eye shields 914.5
Eyebolts 608.31
Eyecup goggles 914.5
Eyes, padlock 617.23
  transom 617.11

F

Faba beans, fresh 122.11
Fabric belting, cotton and hair 314.1
Fabric-measuring devices 390.4
Fabric sizings 390.6
Fabric waterproofing compound 849.6
Fabrics, airship and airplane 396.
  balloon 396.
  coated 392.1
  cotton 300–309
  cotton (rapid reference). (*See* index for individual fabric, as duck, calico, etc.)
  flax 333.
  hemp 334.
  jute 322.
  ramie 334.
  rubberized 392.3
  tire 303.8
  waterproofed 392.4
  wool and hair 365.
  wool and hair (rapid reference). (*See* index for individual fabric, as serge, flannel, etc.)
Face brick 534.11
Face shields 914.5
Facing cloth, woolen 365.95
Factories, lighting of 716.30
Factory brooms 981.64
Factory flooring, pine 411.27
Factory lumber 413.
Fair water caps, propeller, ship 725.42
Falsework, wood 402.2
Fan belts, automobile 722.31
Fans, bracket type, electric 711.23
  desk, electric 711.23
  ventilation 791.1
Farina 109.7
Fast green FCF (food dye) 803.13
Fastener, blind 617.43
  casement 617.43
  door 617.43
  sash 617.43
  scuttle 617.43
  window 617.43
  window screen 617.43
Fasteners, paper 932.5
Fat, wool 043.1
Fats, animal 043.
Faucets 607.6
Fava beans, fresh 122.11
Fearnaught cloth 365.15
Feather dusters 092.2
Feather pillows 315.33
Feathers 092.1
Feed, barley 119.9
  beet pulp 119.1
  buttermilk, concentrated, condensed, dried, or evaporated 021.3
  corn chop 119.2
  corn gluten 103.4
  corn meal 103.4
  corn grit 119.2
  cottonseed 117.1
  fish meal 039.4
  hominy 117.2
  meat scraps and bone meal 098.1
  milk sugar 119.9
  oats 104.1
  rice 119.5
  rye 118.9
  wheat 118.1
Feed flour, rye 118.9
  wheat 118.3
Feed grinders 735.
Feed mills, prevention of dust explosions in 789.
Feed-water heaters 703.9
Feeder boxes, electrical 715.12
Feed-in yokes, trolley 719.63
Feeds 110–119
Feeds (rapid reference). (*See* index for individual commodity, as barley, rice, etc.)
Feeds, milk product 021.9
  mill 118.
  mineral 119.9
  poultry 117.
Feldspar 592.
Felloe bands, automobile tire 722.36
Felloes, wagon wheel 413.54

- Felt, asbestos 545.9
  - fiber 473.2
  - hair 365.98
  - paper 473.2
  - pipe covering 365.98
  - rag 365.98
  - roofing 365.98
  - wool 365.98
- Felt slippers 368.6
- Felt wheels, dental 915.10
- Fence posts, concrete 516.9
  - metal 619.3
  - wooden 401.2
- Fences, steel wire 603.43
- Fencing, wood 402.2
- Fennel oil 813.9
- Fennel seed 154.36
- Ferric compounds 839.34
- Ferro-alloying ores and metals 621.
- Ferro-alloys 621.2
- Ferrochrome 621.21
- Ferromanganese 621.22
- Ferromolybdenum 621.23
- Ferrophosphorus 621.27
- Ferrosilicon 621.24
- Ferrotitanium 621.26
- Ferrotungsten 621.25
- Ferrouranium 621.26
- Ferrous compounds 839.34
- Ferrovanadium 621.26
- Ferrules, condenser tube, brass 645.22
  - conduit 715.11
  - copper 642.22
  - flexible conduit, brass 645.22
- Fertilizer distributors 733.
- Fertilizer mixtures, prepared 854.
- Fertilizers, lime 859.
  - nitrogenous 851.
  - phosphate 852.
  - superphosphate 853.
- Fertilizers and fertilizer materials 850–859
- Feterita 103.5
- Fetter drive screw 608.2
- Fiber, electrical insulating 719.52
  - thermal insulating 473.3
- Fiber board 472.93
- Fiber mats and matting 349.1
- Fiber sponges 293.
- Fibers (abaca, Manila hemp, canton, pacol, maguey, and and sisal) 330.
- Field and track athletic goods and apparatus 943.94
- Fifes 925.2
- Figs 131.3
- Figured sheet glass, rolled 521.4
- Filberts 135.4
- Files, dental 915.10
  - machinists' 615.61
  - stub, office 932.6
- Filing cabinets, wooden 435.5
- Filing cases, wooden 435.5
- Filing furniture, metal 613.7
- Filler, pavement, asphalt 505.15
    - bituminous 505.15
    - cement grout 516.9
    - mineral 512.16
  - pitch 505.15
  - wood 849.2
- Filler button, porcelain, telephone switchboard 718.29
- Filling-station pumps 793.6
- Films, dental 915.14
  - photographic 911.2
- Filter paper 471.2
- Filters, water (waterworks) 619.5
- Fine aggregate 512.13
- Finger cots, rubber 204.52
- Finish lumber 411.43
- Fir grading rules 400.23
- Fire alarms 718.32
- Fire apparatus, hand-drawn 972
  - motorized 722.2
- Fire brick 534.12
- Fire cars, railway 726.1
- Fire clay 531.3
- Fire-clay brick 534.12
- Fire-clay flue linings 534.29
- Fire-clay insulation of boiler furnaces 707.45
- Fire doors, sheet metal 605.22
- Fire engines, automobile 722.2
- Fire extinguishers, chemical, motorized 973.1
  - chemical charges for 973.3
  - hand chemical 973.2
- Fire-extinguishing liquid 839.7
- Fire-extinguishing systems, carbon dioxide 973.4
  - foam type 973.5
- Fire hose, chemical 202.21
  - water 202.41
- Fire-hose fittings 974.2
- Fire-hose racks 974.3
- Fire ladders 979.1
- Fire lanterns 979.2
- Fire-protection systems 970.
- Fire-pump engines, gasoline 705.3
- Fire pumps 755.1
- Fire tile 534.12
- Fire trucks, automobile 722.2
- Firearms 619.1
- Firebox plates, copper 641.21
  - steel 604.11
- Fireworks 860–869
- Firkins, fiber 951.45
  - metal 951.41
  - wooden 951.42
- First-aid supplies 915.52
- Fish 030–039
- Fish (rapid reference). (*See* index for individual name of fish or fish product.)
- Fish, canned 305., 037.
  - fresh 031., 036.
  - salted or dry cured 034.
- Fish flakes, canned 035.4
- Fish-meal feeds 039.4
- Fish net 317.4
- Fish oil (paint material) 848.5
- Fish oils 042.
- Fish paper 472.91
- Fish scrap, meal, and tankage as fertilizer 850.
- Fishing lines 943.8
- Fits, intermember, metal 615.82
- Fittings, aircraft 724.22
  - automobile 722.33
  - brass 645.4
  - bronze 646.51
  - cargo boom 725.41
  - copper tube 645.4
  - diamond core drill 741.3
  - fire hose 974.2
  - lubricator 794.
  - malleable iron, for trolley wire support brackets 611.29
  - pipe, alloy steel 622.3
    - brass 645.4
    - bronze 646.51
    - cast iron 607.14
    - copper 642.23
    - malleable iron 607.2
    - sanitary 646.51
    - steel 607.4
    - wrought iron 607.3
  - plumbing, white metal 655.9
  - railroad car 726.2
  - sanitary, dairy machinery 731.
  - shaft, automobile 732.33
  - toilet and bath inclosure, brass 645.4
  - tube, automobile 722.33
- Fixed lights, ship 725.41
- Fixtures, electric lighting 716.32
  - lighting, gas 645.9
  - store, wooden 436.
- Flag kits 306.46
- Flags, cotton 306.43
  - sector (weight throwing) 943.94
  - silk 306.45
  - wool 306.44
- Flake glue 093.3
- Flakes, bran 109.6
  - corn 109.3
- Flame-cutting equipment 767.
- Flange fittings, pipe, cast iron 607.14
    - malleable iron 607.2
    - steel 607.4
    - wrought iron 607.3
  - welding neck 607.2
- Flanges, floor, brass, for toilets 645.4
- Flannel, Canton 304.2
  - cotton 304.2
  - woolen 365.93
- Flashings, sheet metal 605.22
- Flash-light batteries 712.1
- Flash lights 716.13
- Flasks, boiling 918.9
  - distillation 918.9
  - distilling, Hempel 918.9
    - Saybolt 918.9
  - Engler 918.9
  - Erlenmeyer 918.9
  - except laboratory 955.3
  - Kjeldahl 918.9
  - laboratory 918.9
  - volumetric 918.9
- Flat glass 521.
- Flatware, silver 691.2
- Flavoring extracts 175.
- Flax collars and cuffs 335.
- Flax fabrics 333.
- Flax fiber and manufactures 330–339.
- Flax packing 707.22
- Flax thread 331.3
- Flax twine 331.21
- Flaxseed grain 102.3
- Flaxseed meal 112.1
- Flaxseed oil 143.2
- Flaxseed-oil cake 112.1
- Flexible cord, electric 715.42
- Flexible coupling disks, automobile 722.34
- Flexible metal conduit, electrical 715.11
- Flexible nonmetallic conduit, electrical 715.13
- Flint (abrasive) 541.1
- Flint paper 541.4
- Flitch, panel 402.9
- Floating soap, white 871.15
- Floor blocks, wood 402.3

Floor covering, fiber and straw 349. 1
  linoleum 391.
  rubber 208. 1
  wool 366.
Floor drains, cast iron 611. 14
Floor flanges, brass, for toilets 645. 4
Floor light glass 521. 7
Floor plates, brass (plumbing) 645. 4
  cast iron (plumbing) 611. 19
  cast steel (plumbing) 611. 49
Floor scrubbing brush 982. 3
Floor sweeps, hair 981. 4
Floor tile, hollow clay 534. 22
Floor varnish 846. 33
Flooring, asphaltic mastic 505. 17
  beech 411. 29
  birch 411. 29
  cedar 411. 21
  cypress 411. 22
  fir and Douglas fir 411. 23
  hemlock 411. 24
  larch 411. 29
  lumber 411. 2
  maple 411. 25
  oak 411. 26
  pine 411. 27
  redwood 411. 29
  spruce 411. 28
  tamarack 411. 29
Floors, bridge, concrete 518. 45
   wooden 412. 9
  building 518. 56
Flour, barley 101. 2
  blood 098. 1
  buckwheat 102. 2
  corn 103. 2
  feed 118. 3
   rye 118. 9
  gluten 107. 2
  Graham 107. 4
  oat 104. 2
  pastry 107. 5
  rye 106. 2
  wheat 107. 3
  whole wheat (Graham) 107. 4
Flour bags, cloth 957. 19
Flour bolters 786.
Flour hoppers 786.
Flour middlings, rye 118. 9
  wheat 118. 3
Flour mills, prevention of dust explosions in 789.
Flour paste (insecticide) 881. 27
Flour sifters 786.
Flower seeds 244.
Flowing brushes (paint) 982. 2
Flue linings, fire clay 534. 29
Flues, building 518. 55
Flumes, steel 605. 23
  wooden 429. 9
Fluoborates 839. 9
Fluorides 839. 9
Fluorspar 591.
Fluosilicates 839. 9
Flush bolts, door locking 617. 61
Flush-tank mechanism, brass (plumbing) 645. 4
Flushing valves 607. 6
Flywheel housing, automobile 722. 31
  tractor 729. 5
Flywheel-pulley lugs for stationary gasoline engines 705. 3
Foam extinguisher systems 973. 5
Foam preventive, boiler 882. 2
Fodders 110–119
Fodders (rapid reference). (*See* index for individual fodder, as hay, straw, etc.)
Folding boxes, paper board 953. 2
Folding chairs 438. 3
Followers, draft gear, railway 611. 59
Food colors, coal tar 803. 13
Food preservatives and sweeteners 892.
Football 069. 1
Foot bolts, door locking 617. 61
Footwear, leather 067.
  rubber 203. 1
Forage plant seeds 243.
Force cups, plumbers' 209. 4
Forestry green cloth, woolen 365. 26
Forged steel 611. 51
Forges 615. 54
Forging hammers, power driven 762. 2
Forging steel 603. 24
Forgings, alloy steel 622. 6
  copper-nickel 654. 51
  Monel metal 654. 51
  nickel-copper 654. 51
  steel 611. 5
  wrought iron 611. 3
Forks, rail (tool) 616. 8
  spading 616. 62
Formaldehyde 824.
Formic acid 821. 9
Forms, commercial paper 489.
  concrete building 518. 50
  concrete pavement 743.
  printed 489.
Foundations, building 518. 52
  road 518. 2
  tank, tower, and derrick, concrete 518. 9
Foundries, safety code for 768.
Foundry coke 501. 5
Foundry facings (carbon) 575. 1
Foundry machinery 768.
Foundry patterns, wooden 429. 9
Foundry pig iron 601. 23
Foundry refractories 534. 12
Foundry sand 512. 12
Fountain pen stock, pyroxylin 846. 5
Fountain syringes, rubber 204. 26
Fountains, drinking, sanitary 532. 23
Fourdrinier wire cloth 645. 39
Fowl, killed 015. 3
  live 007.
Fractional horsepower motors, alternating current 711. 21
  direct current 711. 22
Frames, automobile 722. 37
  brass, for ship lights 645. 21
  distributing, telephone 718. 29
  door, metal 605. 22
   wood 423. 9
  locomotive 702. 2
  motor truck 722. 1
  pressed steel, for ship lights 619. 9
  window, metal 605. 22
   wood 423. 9
Frankfurter style sausage 018. 23
Freight-car parts and fittings 726. 2
Freight cars 726. 1
Freight waybills 489.
French folio paper 478. 21
Frequency converters 713. 2
Friction board (paper) 472. 33
Friction tape, electric 719. 56
Fringe, silk 379. 3
Frogs, railroad 606. 3
  trolley 719. 63
Fruit barrels 951. 13
Fruit baskets 952. 11, 952. 12
Fruit boxes, wooden 953. 31, 953. 32
Fruit butter 134. 51
Fruit concentrates 178. 0
Fruit crates 954. 31, 954. 32, 954. 35
Fruit-drying trays 959. 9
Fruit hampers 952. 2
Fruit juices 178., 179.
Fruit-pit pastes 135. 9
Fruit preserves 134. 55
Fruit salads 134. 56
Fruit sauces 134. 56
Fruit trees 259.
Fruits 130–139
Fruits (rapid reference). (*See* Index for individual fruit.)
Fruits, canned 134.
  canned (rapid reference). (*See* Index for the individual fruits.)
  dried 133.
  dried (rapid reference). (*See* Index for the individual fruit.)
  preserved 134. 55
Fuchsin (biological stain) 803. 19
Fuel bags 957. 11
Fuel oil 503. 4
Fuel-oil engines 704. 1
Fuel pump, automobile 722. 31
Fuel-pump mounting, aeronautic 724. 21
Fuel storage tanks, concrete 518. 71
  steel 605. 23, 956. 2
Fuller board 472. 92
Fumigants 881. 3
Fungicides. (*See* Insecticides.)
Funnel tubes, laboratory 918. 9
Funnels, laboratory 918. 2
  sheet metal 612. 29
  tinware 681. 41
Fur 071., 073.
Fur caps 075. 4
Fur mittens 075. 3
Fur parka 075. 1
Fur robes 075. 2
Furnace insulation, fire clay 707. 45
Furnaces, boiler, steam plant 703. 9
  house heating 614. 4
Furniture, bamboo 439. 1
  bathroom, wooden 431. 3
  bedroom, metal 613. 1, 613. 3
   wooden 431. 1
  camp, metal 613. 1, 613. 3
   wooden 433.
  church, wooden 437.
  dining room, wooden 431. 4
  filing, metal 613. 7
   wooden 435. 5
  hospital, metal 613. 1, 613. 3
   wooden 434.
  kitchen, metal 613. 3, 613. 6
   wooden 431. 5
  lawn 432.
  library, metal 613. 2–613. 7
   wooden 431. 6

Furniture, metal	613.
nursery, wooden	431.2
office, metal	613.2–613.7
wooden	435.
porch	432.
rattan	439.1
reed	439.1
school, wooden	437.
store, wooden	436.
theater, wooden	437.
wood	430–439
Furniture hardware	617.
Furniture stock lumber	413.53
Furring tile	534.22
Furs, dressed on the skin	073.
undressed	071.
Fuse blocks	714.22
Fuse clips	714.22
Fuse holders	714.22
Fusees	863.
Fuses, electric	714.21
Fusible plugs for boilers	703.9

G

Gage blanks, plug and ring	615 82
Gage blocks	615.82
Gages. (*See* Gauges, for other than dimension gages.)	
air-brake hose-coupling	202.11
bottle top	615.82
brake beam	611.42
brake shoe, railway	611.43
cable drilling tool joint	754.
car wheel, railway	611.18, 611.53
coupler, railway	611.44
cross arm	615.82
dimension	615.82
insulator pin	615.82
insulator thread	615.82
jar top	615.82
journal bearing	692.3
journal box	611.22
journal length, railway axle	611.52
machinists'	615.82
pipe thread	615.82
round iron	615.82
screw thread	615.82
sheet metal	604.0
taper joint (oil drilling)	615.82
thread (oil drilling equipment)	615.82
tire, railway	611.53
track	615.82
wire	715.40
working barrel (oil drilling)	615.82
Galatea	306.26
Gallic acid	821.9
Galvanized-steel sheets	604.32
Galvanizing	600.3
Game, killed	015.
Garage brush, fiber	982.3
Garage heater, gas	614.9
Garages, except steel	518.51
heating and ventilating of	792.0
steel	605.22
Garbage, processed	119.9
Garbage cans	959.1
Garbage tankage as fertilizer	850.
Garden hose	202.42
Garden seeds	246.
Garlic, fresh	123.8
Garnet paper, abrasive	541.4
Gas, hydrocyanic acid	881.31
Gas analysis apparatus	918.9
Gas and gas appliances, illuminating	997.2
Gas appliances, domestic	997.2
Gas boilers, house heating	614.4
Gas cocks	607.6
Gas cutting of metals	767.
Gas cylinders	956.1
Gas detectors, electric	716.17
nonelectric	997.6
Gas engines	705.
Gas furnaces, hot air, house heating	614.4
Gas gangrene antitoxin	812.
Gas garage heater	614.9
Gas gauges, high pressure	793.2
Gas hose	202.31
Gas-lighting fixtures	997.2
Gas mask canisters	993.
Gas oils	503.4
Gas producers	756.
Gas ranges	614.2
Gas safety code	607.0
Gas stoves	614.2
Gas water heaters	614.2
Gas welding	767.
Gases	839.4
Gaskets	707.1
air-brake hose	707.13
asbestos copper	707.11
cork	707.14
door, rubber	707.13
fiber	707.12
gauge glass	707.13
gun port, rubber	707.13
hatch, rubber	707.13
Gaskets, metal jacketed	707.11
metallic cloth	707.11
paper	707.12
rubber	707.13
signal hose	707.13
Gasoline	503.3
Gasoline cans	959.1
Gasoline engine accessories and parts	705.5
Gasoline engines	705.
Gasoline hose	202.32
Gasoline railway cars	726.1
Gasoline ranges	614.3
Gasoline stoves	614.3
Gasoline tanks	956.2
Gasoline-vapor machines, systems, and lamps	997.4
Gasoline water heaters	614.3
Gasoline-electric generating plants, isolated	705.4
Gatch frame bed spring	613.1
Gate valves	607.6
Gates, sluice, cast iron	611.13
Gauge glass, water	526.6
Gauge-glass gaskets, rubber	707.13
Gauges. (*See* gages, for dimension gages.)	
meteorological	917.4
pressure, automobile	722.33
pressure, vacuum, etc	793.2
tide	916.4
water, glass	526.6
Gauntlets	068.7
Gauze, iodoform	398.23
plain and surgical	398.21
sublimated	398.22
Gauze bandages	398.31
Gauze dressings	398.34
Gauze pads	398.34
Gear bronze, phosphor bronze	647.34
Gears	611.55
Gearshift positions, automobile	722.34
Geese, killed	015.4
live	007.4
Gelatin	093.7
Gelatin sizing	093.7
Generator (electric) accessories and parts	711.4
Generator controllers, electric	714.11
Generator mountings, aeronautic	724.21
automobile	722.32
Generators, acetylene	997.5
alternating current	711.11
arc welding	767.
automobile	711.12
axle (electric)	711.12
direct current	711.12
electric	711.1
farm lighting	711.12
gas welding	767.
isolated electric plant	711.12
steam	703.1
German-silver products	655.
Gib head keys	608.52
Gill line, cotton	302.43
Gimp tacks	608.14
Ginger	154.12
Ginger ale	177.2
Ginger extract	175.9
Gingham	306.18
Gingilli oil	142.8
Girder rails, steel	606.1
Girders, bridge, concrete	518.44
wood	412.1
Glass, flat	521.
floor light	521.7
plate	521.1
prism	521.5
sheet, figured, rolled	521.4
ship port	521.1
sidewalk	521.7
skylight	521.7
special quality	521.6
ultra-violet absorbent	521.6
window, clear	521.2
wire	521.3
Glass containers	955.
Glass cutters	616.18
Glass factory equipment	783.
Glass inclosures for bath and toilet	521.8
Glass insulators	526.1
Glass partitions	521.8
Glass products	521–527
Glass products (rapid reference). (*See* index for individual commodity made of glass.)	
Glass wool	918.9
Glasses (laboratory apparatus)	918.2
Glasses, cover	526.3
lovibond	914.6
lubricator	526.6
medicine	915.45
reading	914.4
Glassware, table	523.
Glazed tile	534.25
Globe valves	607.6
Globes, lantern	524.
lighting	524.
oil lamp	997.3
Glove coloring solution	849.9
Glove leather	064.

Gloves, athletic 068. 1
  cloth, cotton 311. 93
  dress, leather 068. 3
  electrical workers' 203. 2
  knit, cotton 309. 1
    woolen 367. 7
  leather 068.
  riding, leather 068. 4
  rubber 203. 2
  surgeons', rubber 204. 52
  work, leather 068. 2
Glucose 164. 2
Glue, animal 093.
  casein 093. 2
  flake 093. 3
  hide 093. 4
  liquid 093. 6
  marine, for ship decks 505. 36
  pattern maker's 093. 5
  vegetable 282.
Glue brushes 982. 9
Glue stock, animal 093. 1
Gluten, wheat, ground 107. 2
Gluten flour 107. 2
Glycerine 823.
Glycyrrhiza, compound powder of 819. 1
Goal, lacrosse 943. 95
Goal cages, hockey 943. 96
Goal keepers' pads, hockey 943. 96
Goatskin 061. 2
Goggles 914. 5
Gold 662.
Gold-bronze powder 847. 2
Gold chloride 839. 39
Gold lace 399. 9
Gold leaf 849. 5
Gold metal, medicinal 839. 39
Gold shells, dental 915. 10
Gold sulphide 839. 39
Golf balls 209. 91
Golf shafts, hickory 429. 9
Gooseberries, canned 134. 11
  fresh 132. 11
Gouges, woodworkers' 616. 13
Government bronze castings 646. 41
Governors, mechanical 795.
  steam pump 755. 1
Gowns, operating 311. 7
Grab hooks 603. 57
Grading for roads 518. 1
Grading machines, road 743.
Grading rules for hardwood lumber 400. 3
Grading rules for softwood lumber 400. 2
Grading screens, sheet metal 619. 2
  silk cloth 379. 4
Graduates, laboratory 918. 2
Graham bread 108. 1
Graham flour 107. 4
Grain, barley 101. 1
  buckwheat 102. 1
  corn 103. 1
  dried, brewers' and distillers' 119. 4
  oats 104. 1
  rice 105. 1
  rye 106. 1
  wheat 107. 1
Grain hay 111. 2
Grain hopper scales 793. 5
Grain sorghums 103. 5
Granite 511. 1
Granite blocks 511. 71
Grape baskets 952. 11
Grape sugar 161. 4
Grapefruit 131. 22
Grapes, canned 134. 13
  fresh 132. 13
Graphite 574.
Graphite grease, lubricating 504. 44
Graphite paints 843. 7
Graphite pigments 841. 3
Grass hay 111. 99
Grass mats and matting 349. 1
Grass seed 242.
Grass shears 616. 72
Grate bars 611. 15
Grates 611. 15
Gravel 512. 11
Gravel base for roads 518. 29
Gravel pavements 518. 32
Gravel roofing 505. 36
Gravity battery 712. 1
Gravity battery copper 712. 5
Gravity battery zincs 712. 5
Gray cloth, woolen 365. 25
Gray cotton sheeting 304. 75
Gray goods, cotton 304. 1
Gray-iron castings 611. 1
Gray pigments 842. 81
Gray powder 819. 1
Grease, automobile transmission 504. 49
  chain 504. 43
  crank pin 504. 46
  cup 504. 41
  cylinder 504. 42
  driving journal 504. 46
Grease, gear 504. 43
  graphite, lubricating 504. 44
  recuperator 504. 49
  rod cup 504. 46
  wire rope 504. 43
Grease cups 794.
Grease-measuring devices 793. 7
Greases, animal 043.
  lubricating 504. 4
Green (biological stain) 803. 19
Green pigments 842. 85
Greenhouse stock 250–259
Greens, mustard, canned 125. 9
    fresh 121. 9
  turnip, canned 125. 9
    fresh 121. 9
Gregory's powder 819. 1
Grid resistors 714. 12
Grinders, electric 711. 24
  feed 735.
Grinding wheels 541. 3
  dental 915. 10
Grit soap, scouring 871. 26
  toilet 871. 19
Grits, corn 119. 2
  hominy 109. 2
Groats 118. 9
Grocers' bags 957. 2
Grommets, rubber 209. 7
Grooved roofing (lumber) 411. 7
Ground clamps, electric 719. 72
Ground glass joints 918. 0
Grout pavement filler 516. 9
Guard, hub (pole line hardware) 719. 62
  pole 719. 62
Guard-rail cable 603. 42
Guard rails, highway and bridge 402. 2
Guinea green B (food dye) 803. 13
Guitars 929.
Gum, chewing 165. 2
  ester 846. 61
Gum arabic 217.
Gum-arabic sizing 217.
Gum-grading rules (lumber) 400. 33
Gummed paper 479. 2
Gums, varnish 846. 6
Gun, line carrying, for ocean vessels 619. 1
Gun cartridges 619. 1
Gun-metal castings 646. 41
Gun shells 619. 1
Guncotton, soluble 862.
Gunpowder 861.
Gunny sacking 322. 2
Gunny sacks 957. 19
Gutters, sheet metal 605. 22
  street 518. 64
Guy (cable) 603. 42
Guy anchor 719. 62
Guy-anchor bolts 608. 31
Guy clamp 719. 62
Guy-clamp bolts 608. 31
Guy clip 719. 62
Guy hook 719. 62
Guy plate 719. 62
Guy rod 719. 62
Guy-wire protector 719. 62
Gypsum 514. 1
  calcined 514. 2
Gypsum blocks 514. 62
Gpysum plaster 514. 3
Gypsum plaster board 514. 61
Gypsum sheathing board 514. 61
Gypsum tiles 514. 62
Gypsum wall board 514. 61

H

Hackberry grading rules (lumber) 400. 39
Hack saws and hack-saw blades 615. 62
Haddock, canned 035. 1
  dried 034. 9
Haemacytometers 918. 86
Hair, horse, curled 362. 1
  mattress, curled 362. 2
  unmanufactured 362.
  upholstery 362. 3
Hair cushions 315. 35
Hair felt 365. 98
Hair floor sweeps 981. 4
Hair mattresses 315. 13
Hair pillows 315. 35
Hair press cloth 365. 96
Haircloth 365. 96
Hairbrush, military 982. 1
Half soles, leather 067. 6
Halyards 302. 44
Ham, cooked 018. 28
  uncooked 012. 3
Hammer handles 428. 29
Hammer throwing cage 943. 94
Hammers (hand tools) 615. 21, 615. 22
Hammers, athletic 943. 94
  forging, power driven 762. 2
  riveting, pneumatic 615. 9

- Hammers, scaling, pneumatic 615.9
  - sledge 615.22
- Hammocks 319.94
- Hampers 952.2
- Hams 012.3
- Hand brakes, railroad car 726.2
- Hand fire extinguishers 973.2
- Hand drill 615.12
- Hand grit soap 871.19
- Hand lamps, electric 716.13
- Hand leathers 068.5
- Hand pumps 755.3
- Hand saw, carpenters' 616.17
- Hand scrub brush 982.3
- Hand tool steels 603.32
- Hand tools, metal working 615.
- Hand tools other than metal working 616.
- Hand towels, cotton 319.3
  - linen 339.52
- Hand trucks 729.3
- Handballs 943.1
- Hand-drawn fire apparatus 972.
- Handkerchiefs, cotton 313.1
  - silk 376.
- Handle stock lumber 413.51
- Handles, ash, for tools 428.1
  - ax 428.29
  - broom 981.
  - brush 982.
  - door 617.32
    - automobile 722.37
  - drawer 617.32
  - fork 428.1
  - hammer 428.29
  - hatchet 428.29
  - hickory, for tools 428.1
  - hoe 428.1
  - mop 983.1
  - package 428.22
  - rake 428.1
  - shovel 428.1
  - wooden, for agricultural implements 428.1
    - for tools 428.2
- Handrail brackets 617.62
- Handwriting supplies 931.
- Hangars, airplane 518.59
- Hangers (pole-line hardware) 719.62
- Hangers, sash pole 617.11
- Hanging paper (news) 475.4
- Hard rubber goods 205.
  - electrical 205.1
  - surgical 205.3
  - toilet 205.4
- Hardies 615.53
- Hardware, builders' 617.
  - builders' (rapid reference). (*See* index for individual hardware items.)
  - furniture 617.
  - furniture (rapid reference). (*See* index for individual hardware items.)
  - pole line 719.61, 719.62
- Hardwood lumber grading rules 400.3
- Harness 069.2
- Harness hooks 603.57
- Harness leather 066.1
- Harness soap 871.6
- Harps, trolley 726.2
- Harrows 732.
- Harvesting machinery 734.
- Hash, corned beef 018.15
- Hasps and hasp staples 617.13
- Hat hooks 617.63
- Hat materials, straw and fiber 342.
- Hatchet handles 428.29
- Hatchets 616.11
- Hats, except straw and rubber hats 395.2
  - rubber 203.3
  - straw 342.
- Hay 111.
  - alfalfa 111.1
  - alkali 111.96
  - barley 111.2
  - Bermuda 111.3
  - cereal 111.2
  - clover 111.4
  - grain 111.2
  - grass 111.99
  - Johnson 111.91
  - lespedeza 111.92
  - midland 111.98
  - mixed 111.5
  - oat 111.2
  - packing 111.99
  - peanut 111.94
  - pea-vine 111.95
  - prairie 111.93
  - salt 111.96
  - sample 111.99
  - soybean 111.99
  - Sudan 111.97
  - timothy 111.6
  - vetch and cereal mixed 111.5
  - wheat 111.2
  - wild oat 111.99
- Hay net 317.5
- Head cheese 018.21
- Head-lamp mounting, motor cycle 725.2
- Head lamps, automobile, acetylene 722.33
  - electric 716.12
- Head net 317.6
- Head walls, masonry 518.66
- Headings, barrel 421.3
- Headlight reflectors, locomotive 716.2
- Headlights, automobile 722.32
  - locomotive 716.2
- Headsets, radio 718.69
- Hearts, beef 011.2
- Heat coils 714.21
- Heat symbols 700.
- Heat treatment of metals 600.5
- Heater cord 715.42
- Heater covering, magnesia 707.43
- Heater wire, electric 715.43
- Heaters, electric 717.1
  - feed water 703.9
  - garage, gas 614.9
  - space, gas 614.2
  - water, gas 614.2
    - gasoline 614.3
    - oil 614.3
- Heating boilers (house heating) 614.4
- Heating devices, electric 717.1
- Heating equipment, acetylene 614.9
- Heating equipment for buildings 792.1
- Heating equipment for power plants 792.1
- Heating furnaces and radiators 614.4
- Heating systems for water tanks 614.4
- Hectograph ribbons 932.2
- Hedge trimmers 616.72
- Heels, rubber 203.13
- Heifers 001.2
- Helical springs 611.54
- Hellebore 881.14
- Helmets, sand blasting 914.5
  - welders', chippers', riveters' 914.5
- Hemlock grading rules 400.24
- Hemp cable 332.
- Hemp cordage 331.16
- Hemp fabrics 334.
- Hemp fiber 330.
- Hemp rope 331.16
- Hemp thread 331.3
- Hemp twine 331.22
- Hempel distilling flask 918.9
- Herbaceous perennials 251.
- Heroin 811.
- Herring, canned 035.5
- Herring oil 042.3
- Herring roe, canned 035.5
- Hexamethylenetetramine 819.9
- Hickory grading rules 400.34
- Hickory nuts 135.9
- Hide glue 093.4
- Hide rope, sisal 341.2
- Hides, steer (leather) 061.8
- Hides and skins, cattle (raw) 051.
  - horse 052.
  - sheep 053.
- High jump standards 943.94
- High-speed tool steels 603.32
- Highway bridges, steel 605.21
  - wooden 412.2
- Highway crossing signals 718.41
- Highway guard rail 402.2
- Highway markers and signs 998.
- Highway signals 718.5
- Highway signs 998.
- Hinge hasps 617.13
- Hinge rods, automobile engine hood 722.37
- Hinges 617.12
- Hip boots 203.11
- Hobs, milling 765.
- Hockey ball 943.1
- Hockey goods and apparatus 943.96
- Hockey puck 209.92
- Hockey sticks 429.9
- Hods, coal 951.64
- Hoes 616.62
- Hog-cholera virus 812.
- Hogs 002.
- Hogsheads 951.5
- Hoists 744.2
- Holders, blotter 931.5
  - crayon 931.2
  - designation card, telephone 718.29
  - door 617.44
  - hospital 915.42
  - pencil 931.2
  - toilet paper, brass 645.4
  - tool, lathe 765.
  - toothbrush, brass 645.4
  - tumbler, brass 645.4
- Holland shade cloth 392.22
- Hollands, brown 333.2
- Hollow building tile, clay 534.22
- Hollow building units, concrete 516.4
- Hollow floor tile, clay 534.22
- Hollow ware, aluminum 631.5
  - copper 642.5
  - German silver 655.6

Hollow ware, iron and steel 612. 2
  nickel bronze 655. 6
  nickel-copper-zinc alloy 655. 6
  nickel-silver 655. 6
  silver 691. 2
  tin 681. 41
Homatropine hydrobromide 811.
Hominy and hominy grits 109. 2
Hominy feed 117. 2
Hones 541. 2
Honey 162.
Honey cases 953. 36
Honey-dew melons, fresh 132. 3
Hoods, knit, rayon 397. 13
    woolen 367. 3
  protective, chemical industry, sandblasting 914. 5
Hoof meal as fertilizer 850.
Hoofs 091.
Hooks (builders' hardware) 617. 63
Hooks, baggage 617. 63
  chain 603. 57
  clothesline 617. 63
  clothing 617. 63
  coat 617. 63
  door 617. 63
  grab 603. 57
  guy 719. 62
  harness 603. 57
  hat 617. 63
  hoist and sling 603. 57
  sash pole 617. 11
  towel 617. 63
Hooks for manual handling of commodities 616. 41
Hoops, barrel, wood 421. 3
  iron and steel 604. 22
  keg, wood 421. 3
Hopper scales 793. 5
Hoppers, dump and storage 959. 7
  flour 786.
Hops 155. 4
Horn gap switches 714. 52
Horn meal as fertilizer 850.
Horns (band instruments) 925.
Horns, animal 091.
Horse blankets, cotton 319. 96
  jute 329. 2
  woolen 369. 22
Horse meat 016.
Horsehair, curled 362. 1
Horsehide glove leather 064. 1
Horsehide shoe leather 061. 3
Horsehides, raw 052.
Horseradish 154. 13
Horses 004.
Horseshoe nails 608. 11
Horseshoe pads, rubber 209. 2
Horseshoes 603. 6
  pitching 943. 5
Hose (rubber, cotton, and linen) 202.
Hose (wearing apparel). (*See* Hosiery.)
Hose, air 202. 1
  air brake 202. 11
  automobile, rubber 722. 31
  chemical fire 202. 21
  cold water 202. 42
  divers' 202. 13
  fire 202. 41
  flax-line 202. 41
  garden 202. 42
  gas 202. 31
  gas welding 202. 12, 202. 31
  gasoline 202. 32
  hot water 202. 44
  linen 202. 41
  metallic 607. 7
  oil 202. 22
  pneumatic tool 202. 12
  radiator 02. 43
  signal 202. 11
  spray 202. 42
  steam 202. 44
  suction 202. 46
  tank 202. 45
  tender 202. 45
  water 202. 41–202. 46
  welding outfit 202. 12, 202. 31
Hose clamps 202. 9
Hose clamps and fittings, automobile 722. 31
Hose connections for railway cars 726. 2
Hose connections for welding torches 767.
Hose duck 303. 97
Hose racks 974. 3
Hose tips, rubber 209. 8
Hosiery cotton 309. 2
  rayon 397. 11
  silk 375. 2
  woolen 367. 1
Hospital beds and cots, metal 613. 1
Hospital equipment 915. 3
Hospital furniture, wooden 434.
Hospital supplies 915. 5
Hospital utensils 915. 4
Hot-air furnaces 614. 4
Hot-air heating for houses 614. 4
Hot plates, gas 614. 2
Hot-water bottles, rubber 204. 23
Hot-water heating for houses 614. 4
Hot-water hose 202. 44
Hot-water radiators 614. 4
Hot-water tanks 614. 4
Hotel equipment, sheet metal 619. 2
Hotel hollow ware 612. 22
Hotel stamped ware 612. 22
House-heating radiators 614. 4
Household brooms 981. 5
Household devices, electric 717.
Household furniture, metal 613.
  wooden 431.
Household hollow ware 612. 22
Household measures 919. 1
Household stamped ware 612. 22
Houselines, hemp 331. 12
Houses 518. 51
Hub guards (pole line hardware) 719. 62
Hubbard squash 122. 6
Hubs, propeller, boat 725. 3
    ship 725. 42
Huck toweling, cotton 304. 92
  linen 333. 3
Huck towels, cotton 319. 3
Huckleberries, canned 134. 11
Hull details, ship 725. 41
Hulls, ship, care and maintenance of 725. 43
Humidity, determination of 300. 4
Hurdles, athletic track 943. 94
Hydrants 607. 6
Hydrastine 811.
Hydrastine hydrocloride 811.
Hydrastis 811.
Hydrated lime 517. 2
Hydrated soda 834. 7, 834. 8
Hydraulic cement 516. 19
Hydraulic jacks 616. 91
Hydraulic leather 066. 2
Hydraulic symbols 706. 0
Hydraulic turbines 706. 1
Hydrochinone 839. 5
Hydrocholoric acid 821. 3
Hydrocyanic acid 821. 9
Hydrocyanic acid gas (fumigant) 881. 31
Hydrofluoric acid 821. 4
Hydrogen 839. 42
Hydrogen arsenide 814. 2
Hydrogen peroxide 891.
Hydrographs 919. 7
Hydrometers 919. 4
Hydroquinone 839. 5
Hyoscyamine hydrobromide 811.
Hyoscyamine sulphate 811.
Hyoscyamus 811.
Hyoscyamus extract powder 819. 1
Hypodermic needles, dental 915. 10
  surgical 915. 27
Hypodermic syringes, surgical 915. 27
Hypodermic tablets 819. 9
Hypophosphorous acid 821. 9

I

Ice bags, rubber 204. 21
Ice cake sizes 959. 4
Ice cream 165. 3
Ice-cream cans 959. 1
Ice-cream machinery 785.
Ice-cream molds 785. 2
Ice-hockey goods 943. 96
Ice-making machinery 785.
Ice tanks, refrigerator car 726. 2
Ignition coils 713. 6
Ignition system for oil burners 614. 9
Illuminating engineering nomenclature 716. 0
Illuminating oils 503. 5–503. 7
Illuminating wax 504. 52
Illumination codes 716. 30
Illustrating board (paper) 472. 95
Imitation pearls 561.
Imitation precious stones 560–569
Impedance bond, railway track 718. 49
Implements, agricultural 730–739
Impregnation of windings (electrical) 719. 59
Impregnation of wood 400. 4
Impression compound, dental 915. 19
Incandescent lamps, electric (ordinary) 716. 11
Incinerators, portable type, gas 997. 2
  stationary type 518. 9
Inclosure (toilet) fittings and trimmings, brass 645. 4
Inclosed fuses 714. 21
Inclosed switches, electrical 714. 52
Inclosures, bandit resisting 518. 54
  glass, for toilet and bath 521. 8
  marble, for toilet and bath 511. 3
  metal, for toilet and bath 617. 79
  motion picture 518. 54
  slate, for toilet and bath 511. 52
  soapstone, for toilet and bath 511. 6
Incubators, biological 918. 85
  poultry, oil heated 614. 9
Indelible marking ink 933. 9
Index bristol cardboard 474. 2
Index paper 478. 19

India twine, jute 326.
Indicator posts for water-main valves 607.4
Indicators, engine cylinder 793.3
  railway signal 718.41
Indigo 803.11
Indigo carmine 803.19
Indigotine (food dye) 803.13
Indium metal, medicinal 839.39
Inductance coils, radio 718.65
Induction motors 711.21
Induction regulators 713.5
Inductors 713.6
Industrial buildings, except steel 518.51
  steel 605.22
Industrial locomotives, electric 721.1
Industrial tractors, electric 721.2
Industrial truck tires, solid rubber 206.5
Industrial trucks, electric 721.2
Infants' bands, cotton 309.4
Inflators, rubber 204.94
Infusorial earth 593.
Ingots, aluminum and aluminum alloy 631.12
  aluminum bronze 647.11
  antimony 632.2
  bearing metal 692.
  brass 644.11
  bronze 646.11
  copper 641.11
  copper-nickel 654.1
  lead 651.1
  manganese bronze 647.21
  Monel metal 654.1
  nickel 653.1
  nickel-copper 654.1
  phosphor bronze 647.31
  spelter 683.1
  tin 681.1
  zinc 683.1
Inhalers (medical) 915.31
Injectors, locomotive 702.9
Ink 933.
  copying 933.1
  drafting 933.3
  drawing 933.3
  lithographic 933.2
  marking, for fabrics 933.9
  printing 933.2
  record 933.1
  red 933.1
  stamp pad 933.4
  writing 933.1
Ink eradicators 931.4
Ink powder 809.2
Inks for office devices 933.4
Inlay casting investment (dental) 514.2
Inlay casting wax (dental) 915.19
Inlets, drainage 518.65
Inner tubes for automobile tires 206.3
Inner tubes for motor-cycle tires 206.4
Insect powder 881.26
Insecticide, arsenic trioxide 881.18
  Bordeaux mixture 881.23
  calcium arsenate 881.12
  calcium arsenite 881.12
  flour paste 881.27
  hellebore 881.14
  lead arsenate 881.11
  lead arsenite 881.11
  London purple 881.15
  magnesium arsenate 881.19
  mercuric chloride 881.25
  naphthalene 881.28
  Paris green 881.15
  Pyrethrum 881.26
  Schlee's green 881.15
  sodium arsenate 881.13
  sodium arsenite 881.13
  sodium cyanide 834.1
  sodium fluoride 881.17
  white arsenic 881.18
  zinc arsenite 881.19
Insecticides 881.
  contact 881.2
  lime and sulphur 881.21
  nicotine 881.24
  soap and oil spray 881.22
  sulphur 881.21
Insoles 067.6
Instrument cases and mountings, aircraft 724.26
Instrument mountings, automobile 722.32
Instrument transformers 713.5
Instruments, aeronautical 724.26
  angle measuring, engineers' 916.22
  band 925.
  dental 915.11
  drafting 935.
  electrical measuring 714.3
  engineers' 916.
  length measuring, engineers' 916.21
  mathematical 916.1
  medical 915.2
  meteorological 917.
  musical 920–929
  nautical 919.6
  radio (measuring) 718.65
Instruments, surgical 915.2
  surveyors' 916.
  telegraph 718.11
  telephone 718.21
Insulated bolts 719.63
Insulated cabinets, fire resistant 613.5
Insulated cable (electric) 715.41
Insulated cord (electric) 715.42
Insulated wire, copper 715.44
  heater 715.43
  iron and steel 715.43
Insulating brick 534.12
Insulating joints for lighting fixtures 716.32
Insulating materials, electrical 719.5
Insulating mortar 534.12
Insulating oil 504.8
Insulating paper, electrical 492.
Insulating paper and fiber, thermal 473.3
Insulating silk, electrical 372.7
Insulating tissue paper, electrical 476.23
Insulation, boiler, asbestos 707.42
    magnesia 707.43
  fire clay, for boiler furnaces 707.45
  pipe, asbestos 707.42
    cork 707.41
    felt 707.44
    magnesia 707.43
  rubber 719.55
Insulator gage 615.82
Insulator knobs 532.22
Insulator pins, metal 719.61
  wooden 429.7
Insulators, cap and cone, trolley 719.63
  glass 526.1
  porcelain 532.22
  strain 719.62
    composition, trolley 719.63
    globe, trolley 719.63
    porcelain 532.22
  wooden 429.7
Insulin 812.
Interior trim, wood 411.42
Interlocking machines, railway track 718.42
Interlocking switch operating mechanisms and signals 718.42
Internal-combustion engines 704., 705.
Interurban cars 726.1
Investment, dental 514.2, 915.10
Iodine (chemical reagent) 839.9
Iodine, medicinal 814.1
Iodoform 819.9
Iodoform gauze 398.23
Iodum- potassii 819.3
Ipecac 811.
Ipecac and opium powder 819.1
Iridium metal, medicinal 839.39
Irish potatoes, canned 127.51
  fresh 123.51
Iron, albuminized 839.34
  cast, gray 611.11
    malleable 611.21
  peptonized 839.34
  pig 601.2
  reduced 839.34
  structural 605.
    for bridges 605.11
    for buildings 605.12
    for cars and locomotives 605.13
    for machinery 605.14
    for ships 605.15
Iron and ammonium citrate 839.34
Iron and quinine citrate 811.
Iron and strychnine citrate 811.
Iron bars, engine bolt 603.1
  rivet 603.1
  staybolt 603.1
Iron billets 602.1
Iron blooms 602.1
Iron by hydrogen 839.34
Iron compounds and salts 839.34
Iron (electric) cord 715.42
Iron hydroxide paints 843.8
Iron hydroxide pigments, red 841.41
Iron ore 601.1
Iron oxide paints 843.8
Iron oxide pigments, brown 841.42
  red 841.41
Iron plates 604.1
Iron products 600–619
Iron products (rapid reference). (*See* index for individual commodity made of iron.)
Iron rivets 608.4
Iron scrap 600.2
Iron sheets 604.2
Iron sulphate for water treatments 882.2
Iron wire 603.41
Ironers, domestic, gas 997.2
  laundry 787.
Irons, sash cord 617.5
  soldering 615.71
Ironware, enameled 612.2
Irrigators, medical 915.31
Italian cloth (suiting) 306.33
Ivory 095.
Ivory-nut meal 112.9
Ivory nuts 291.

J

Jack chain, weldless 603.56
Jack panels, telephone 718.22
Jackets, cotton 311.1
  life, kapok 349.5
Jacks, lifting 616.91
  radio receiver 718.69
  telephone 718.29
Jalap powder 819.1
Jambs, wood, for doors and sash 423.9
Jams, fruit 134.52
Japan driers 849.11
Japan paints 843.4
Japanned upper leather 062.
Jar rings, rubber 208.6
Jars 955.4
  battery, hard rubber and glass 712.3
  laboratory 918.3
Javelins 943.94
Javelle water 891.
Jean cloth, cotton 304.5
Jellies, fruit 134.53
Jelly jars 955.4
Jersey cloth, cotton 309.3
Jerseys, rayon 397.14
  woolen 367.4
Jewelry, metal 660–669
Johnson bay 111.91
Joint fillers, asphalt and bituminous 505.15
  cement grout 512.16
  premolded (paving) 505.15
Joint plates or bars, railroad 606.2
Joints, ground glass 918.0
  insulating, for lighting fixtures 716.32
  slip, copper (steam pipe) 642.9
Joists, steel, open web 605.12
  wood 402.43, 412.1
Journal bearings 692.3
Journal-box packing, cotton 301.12
  wool 363.1
Journal-box packing tools 616.99
Journal boxes 611.22
Jugs 955.7
Juice, fruit 178., 179.
  grape 178.4
  lemon 178.1
  lime 178.2
  orange 178.3
  tomato, canned 126.7
Junction boxes, electrical 715.12
Juniper oil 813.9
Jute 321.
Jute and hair felt 365.98
Jute bagging 322.2
Jute baling material 322.3
Jute board 472.34
Jute burlap 322.1
Jute butts 321.
Jute cordage 325.
Jute fabrics 322.
Jute machinery 774.
Jute packing 707.27
Jute padding 329.1
Jute rope 325.2
Jute twine 326.
Jute waste 390.5
Jute webbing 394.3
Jute yarns 324.1

K

Kafir corn 103.5
Kalamein doors 605.22
Kale, fresh 121.8
Kangaroo leather 061.4
Kaoliang, brown 103.5
Kaolin 531.4
Kapok life preservers 349.5
Kapok mattresses 315.12
Kapok pads 349.4
Kapok pillows 315.34
Keene's cement 514.2
Kegs, metal 951.43
  wooden 951.44
Kernel pastes 135.9
Kerosene 503.5
Kerosene engines 704.1
Kerosene heaters, portable 614.3
Kerosene stoves 614.3
Kersey 365.16
Kettles, soap, laundry 787.
Key plates 617.23
Keyhole saw 616.17
Keys, brake shoe 611.43
  cotter 608.51
  propeller, ship 725.42
  shaft 608.52
  telegraph 718.12
Keyways 608.52
Khaki cloth, cotton 306.34
  woolen 365.27
Khaki webbing 394.1
Kick plates 617.34
Kidneys, beef 011.5
Kindergarten supplies 937.3
Kipskins 051.
Kitchen cutlery 612.14
Kitchen furniture, wood 431.5
Kitchen sinks, metal 612.23
  porcelain 532.23
  slate 511.52
  soapstone 511.6
Kitchen soap 871.2
Kitchen tables, metal 613.6
  wood 431.51
Kitchen utensils, metal 612.14, 612.22
  wooden 429.1
Kits, engineers' 958.1
  fiber (containers) 951.66
  flag 306.46
  metal (containers) 951.61
  tool 958.2
  wooden (containers) 951.62
Kjeldahl flasks 918.9
Knees, ship's 401.5
Knife switches, electrical 714.52
Knit goods, cotton 309.
  rayon 397.1
  woolen 367.1–367.7
Knitting machinery 771.
Knives, draw 616.15
  kitchen 612.14
  pocket 612.11
  silverware 691.2
Knob pulls 617.33
Knobs, door 617.31
  insulator 532.22
Knuckles, beef 011.3
Kraft board 472.93
Kraft wrapping paper 477.3, 477.4
Kummel extract 175.9

L

Labels, woven 393.
Laboratory apparatus and supplies 918.
Laboratory porcelain ware 532.21
Lace, cotton 313.2
  gold 399.9
  silk 378.
  silver 399.9
Lace leather 066.4
Lace-making machinery 771.
Lacing, leather 066.4
Lacing cord, cotton 302.45
Lacquer. (*See also* Varnish.)
  waterproof 846.5
Lacquering brushes 982.2
Lacrosse balls 209.91
Lacrosse goods 943.95
Lactic acid 821.9
Lactose 161.7
Ladder chain, weldless 603.56
Ladder stock lumber 413.9
Ladders, fire 979.1
  mine 751.
  pilot (ship) 725.41
  wooden 429.4
Ladles, plumbers' 615.9
Lag bolts 608.2, 608.31
Lag screws 608.2
Lagging, boiler, asbestos 707.42
    magnesia 707.43
Lake copper bars 641.11
Lakes, color 803.12
Lamb, prepared or preserved 018.3
Lamb carcasses and cuts 014.1
Lambs 003.
Laminated insulating materials 719.58
Lamp chimneys 524.
Lamp cord 715.42
Lamp globes, oil lamp 524.
Lamp mountings, automobile 722.32
Lamp shades, glass 524.
Lamp sockets, electric 715.21
Lampblack 842.4
Lamps, acetylene 997.5
  animal, electric 716.13
  arc 716.16
  automobile, acetylene 722.33
    electric 716.12
  cap, electric 716.17
  dial illuminating 716.14
  electric 716.1
  except electric 997.
  flash light 716.13
  gasoline vapor 997.4
  hand, electric 716.13
  incandescent, miniature 716.12
    ordinary 716.11
  mercury vapor 716.15
  miners', electric 716.17
    nonelectric 997.6
  motor boat, electric 716.12
  oil 997.1
  pilot 716.14
  Saybolt test 997.1
  therapeutic, carbon arc 716.16
Landing gear, airplane 724.22
Lantern globes 524.

- Lantern slide projectors 912.
- Lanterns, electric 716. 13
  - fire 979. 2
  - oil 997. 1
- Larch grading rules 400. 25
- Lard 043. 2
- Lard cans 959. 1
- Lard oil 041. 3
- Lard substitutes 043. 3, 142. 95
- Latches 617. 22
- Lath, metal 605. 24
  - wood 402. 51
- Lathes, metal turning 761. 1
- Launderometer 770.
- Laundry bags 957. 19
- Laundry machinery and appliances 787.
- Laundry soap, liquid 871. 24
  - ordinary 871. 21
- Laundry soap chips 871. 22
- Laundry soap powder 871. 23
- Laundry soda 834. 7
- Laundry sours 871. 25
- Laundry stoves, gas 614. 2
- Laundry tables 613. 6
- Laundry tray bibb 607. 6
- Laundry trays, porcelain 532. 23
  - slate 511. 52
  - soapstone 511. 6
- Laundry washroom practice 787.
- Lavage tube, rubber 204. 54
- Lavatories, cast iron 612. 23
  - porcelain 532. 23
- Lavatory plug, brass 645. 4
- Lavatory traps, brass 645. 4
- Lavelle 373. 29
- Lavender oil (food product) 142. 96
- Lavender oil (medicinal) 813. 9
- Lawn (cotton dress goods) 306. 14
- Lawn furniture 432.
- Lawn mowers 616. 73
- Lead alloys 651. 6
- Lead arsenate 881. 11
- Lead arsenite 881. 11
- Lead bars 651. 2
- Lead-base bearing metals 692. 1
- Lead castings 651. 3
- Lead chromate 839. 35
- Lead coatings 600. 3
- Lead compounds and salts 839. 35
- Lead-covered cables, electrical 715. 41
- Lead ingots 651. 1
- Lead metal, medicinal 839. 35
- Lead nitrate 839. 35
- Lead paints, mixed 843. 6
- Lead pencils 931. 1
- Lead pigments 842. 6
- Lead sheets 651. 5
- Lead strips and sleeves 651. 4
- Leads, pencil 931. 1
- Leaf springs 611. 54
- Leaf tobacco 261.
- Leather, artificial 066. 7
  - bag 066. 9
  - bellows 069. 6
  - belting 066. 3
  - chamois skin 061. 7
  - chrome tanned, test methods 060.
  - cowhide, rough tanned 065. 1
  - elk 061. 1
  - glove 064.
  - harness 066. 1
  - horsehide 061. 3, 064.
  - hydraulic 066. 2
  - kangaroo 061. 4
  - lace 066. 4
  - oil grain 061. 5
  - pigskin 061. 6
  - rawhide 065. 2
  - rigging 066. 8
  - rough tanned 065.
  - sheepskin 061. 7
  - shoe upper, except patent 061.
    - patent 062.
  - sole, hemlock tanned 063. 3
    - oak tanned 063. 6
    - vegetable tanned 063. 6
  - steer hide 061. 8
  - strap 066. 6
  - upholstery 066. 7
- Leather and leather manufactures 060–069
- Leather athletic goods 068. 1, 069. 1
- Leather belting 066. 3
- Leather board (paper) 472. 35
- Leather cases 069. 7
- Leather cleaner 891.
- Leather clothing 069. 4
- Leather dressing 891.
- Leather footwear 067.
- Leather gloves 068.
- Leather lacing 066. 4
- Leather mittens 068. 6
- Leather packing 707. 26
- Leather straps 069. 5
- Leathers, hand 068. 5
- Leavening agents 155.
- Lecture apparatus, scientific 918. 9
- Ledger paper 478. 13
- Leggings, cotton 311. 94
- Lemon drops 165. 1
- Lemon extract 175. 6
- Lemon juice 178. 1
- Lemon oil 142. 97
  - medicinal 813. 9
- Lemons 131. 23
- Length-measuring instruments, engineers' 916. 21
- Lenses, automobile lamp 525. 4
  - lighthouse 525. 1
  - motor-cycle lamp 525. 4
  - optical 914. 1
  - signal lamp 525. 3
- Lentils, canned 126. 12
- Lentils, fresh 122. 12
- Lespedeza hay 111. 92
- Letter-box plates 617. 9
- Lettuce, canned 125. 2
  - fresh 121. 2
- Levant wormseed 221.
- Levels, engineers' 916. 6
  - hand 616. 32
- Leverage bars 616. 91
- Library furniture, metal 613. 2–613. 7
  - wooden 431. 6
- Library paste 932. 5
- License plate, automobile 722. 39
- License-plate bracket, automobile 722. 39
- Licorice powder 819. 1
- Life belts, cork 425. 3
- Life-buoy rings, balsa wood 429. 9
  - cork 425. 3
- Life buoys, kapok 349. 5
- Life coats, kapok 349. 5
- Life jackets, kapok 349. 5
- Life preservers, cork 425. 3
  - kapok 349. 5
- Life rafts 725. 3
- Lifeboat disengaging apparatus 725. 41
- Lifeboats 725. 3
- Lifters, transom 617. 5
- Lifts, sash and screen 617. 35
- Ligatures, catgut 915. 56
- Light green, S F, yellowish (biological stain) 803. 19
- Light green, S F, yellowish (food dye) 803. 13
- Lighthouse lenses 525. 1
- Lighting cable, automobile 715. 41
- Lighting codes 716. 30
- Lighting fixtures, electric 716. 32
  - gas 997. 2
- Lighting globes 524.
- Lighting panels and panel boards 714. 41
- Lighting plants, isolated 705. 4
- Lighting requirements 716. 30
- Lighting switches 715. 22
  - automobile 722. 32
- Lightning arresters 715. 51
- Lightning-rod equipment 715. 50
- Lightning safety code 715. 50
- Lights, fixed, for ships 725. 41
  - warning signal, automobile 722. 32
  - water, self igniting 997. 5
- Lima beans, canned 126. 11
  - dry 126. 11
  - fresh 122. 11
- Lime 517. 2
  - chlorinated 833. 2
  - hydrated 517. 2
- Lime bags, paper 957. 2
- Lime barrels 951. 10
- Lime for water treatment 882. 2. 882. 3
- Lime juice 178. 2
- Lime plaster 514. 4
- Lime stucco 514. 4
- Lime sulfur solution (insecticide) 881. 21
- Limes 131. 24
- Limestone 511. 2
- Liming materials, agricultural 859.
- Line, chalk 302. 42
  - fishing 331. 11
  - gill 302. 43
- Line-carrying guns for ocean vessels 619. 1
- Line materials, electrical 719. 6
- Line materials, electrical (rapid reference). (*See* index under individual items desired.)
- Line pipe, steel (oil, gas, or water) 607. 4
  - wrought iron (oil, gas, or water) 607. 3
- Line shafts 611. 52
- Line wire, copper 715. 44
  - iron and steel 715. 43
- Linear measures 919. 1
- Lineman's belt 069. 3
- Linen, dowlas 333. 1
  - table 339. 3
- Linen products 330–339
- Linen products (rapid reference). (*See* index for individual commodities made of linen.)
- Liner plates, sewer, vitrified clay 534. 29
- Liners, axle 692.
  - bearing 692.
- Lining, barrel, asphalt 505. 19
  - brake 722. 38
  - car, wooden 413. 29
  - carpet 319. 6

Lining, closet, cedar ... 411.9
  cotton ... 306.2
  duck ... 303.4
  paper, for boxes ... 957.2
  shipping box, metal ... 959.9
  satin ... 373.25
  silk ... 373.25
Lining bar, track ... 616.91
Link fuses ... 714.21
Linoleum floor covering ... 391.
Linseed grain ... 102.3
Linseed meal ... 112.1
Linseed oil ... 143.1
  boiled (for paint) ... 848.12
  medicinal ... 813.5
  raw (for paint) ... 848.11
Linseed-oil cake ... 112.1
Linsey-woolsey ... 308.3
Lintels, cast iron ... 611.19
Linters, cotton ... 301.3
Liquid glue ... 093.6
Liquid laundry soap ... 871.24
Liquid measures ... 919.1
Liquid measuring devices ... 793.6
Liquid toilet soap ... 871.12
Liquors, distilled ... 171.
Lister, agricultural ... 732.
Litharge pigments ... 842.62
Lithium compounds ... 839.39
Lithographic ink ... 933.2
Lithographic prints ... 483.
Lithographing varnish ... 846.7
Lithopone ... 842.7
Lithopone paint, interior, flat finish ... 843.1
    gloss finish ... 843.2
Litters, medical ... 915.33
Livers, beef and veal ... 011.4
Livestock ... 000–009
Loading machines for mines ... 751.
Loaf sugar ... 161.3
Lobsters, canned ... 037.3
  fresh ... 036.4
Lock link chain, weldless ... 603.56
Lock nuts for ball bearings ... 766.2
Lock screws, bronze (propeller hub) ... 646.59
Lock washers ... 608.6
Lockers, metal ... 613.5
Locks, bolt ... 617.61
  door ... 617.21
    automobile ... 722.37
  safe and vault door ... 613.5
  sash ... 617.43
  window ... 617.43
Locomotive accessories and parts ... 702.
Locomotive cranes ... 744.1
Locomotives, electric ... 721.1
  industrial, electric ... 721.1
  mine ... 721.1
  steam ... 701.3
Loins, mutton ... 014.2
  pork ... 012.2
Log cars, railway ... 726.1
Loganberries, canned ... 134.11
  fresh ... 132.11
Logarithmic cloth (tracing cloth) ... 392.12
Logarithmic paper ... 478.35
Logging safety code ... 784.0
Logs ... 401.9
Logwood black (dye) ... 803.10
London purple ... 881.15
Long link chains ... 603.51
Long oil varnish ... 846.2
Long-staple cotton ... 300.1
Long-time burning oil ... 503.7
Loud-speakers, radio ... 718.69
Lovibond glasses ... 914.6
Lubricant, chain ... 504.19
  gear ... 504.19
  rear axle ... 504.49
  wire rope ... 504.19
Lubricating devices ... 794.
Lubricating oil, car-axle generator ... 504.12
  chain ... 504.19
  clock ... 504.35
  crank case ... 504.34
  cylinder ... 504.2
  Diesel engine ... 504.23
  dynamo ... 504.31
  forty-five degrees below zero ... 504.19
  gear ... 504.19
  heavy asphaltic ... 504.11
  journal box ... 504.13
  machine gun ... 504.32
  pump ... 504.31
  reclaimed ... 504.13
  sewing machine ... 504.35
  spindle ... 504.31
  transmission ... 504.34
  typewriter ... 504.35
  valve ... 504.24
  wire rope ... 504.19
  zero Fahrenheit ... 504.19
Lubricating-oil bottles ... 955.1
Lubricator and lubricator fittings ... 794.
Lubricator cups ... 794.
Lubricator glasses ... 526.6
Lug boxes, wooden ... 953.35
Lugs, battery tray terminal, electric vehicle ... 721.2
  soldering ... 715.34
  terminal, electric ... 715.35
Lugs for fruits ... 953.31
Lumber ... 400–413
Lumber (common boards) ... 402.42
Lumber, airplane stock ... 413.3
  boat stock ... 413.1
  box ... 413.9
  car stock ... 413.2
  ceiling ... 411.3
  cigar box ... 413.9
  concrete form, end matched ... 411.9
  cooperage stock ... 413.7
  crate ... 402.42
  decking ... 412.9, 413.4
  dimension ... 402.43
  door ... 413.8
  dressed and matched ... 411.6
  factory ... 413.
  finish ... 411.43
  flooring ... 411.2
  furniture stock ... 413.53
  handle stock ... 413.51
  hardwood, grading rules ... 400.3
  inspection of ... 400.14
  ladder stock ... 413.9
  millwork ... 413.8
  molding ... 411.4
  partition ... 411.41
  pattern stock ... 413.6
  pencil stock ... 413.9
  pipe stave ... 413.9
  plywood ... 413.52
  roofing ... 411.7
  shelving ... 411.8
  ship lap ... 411.5
  ship stock ... 413.4
  shop ... 413.
  siding ... 411.1
  softwood, grading rules for ... 400.2
  stepping ... 411.9
  strip ... 402.41
  structural ... 412.
  tank stock ... 413.1
  vehicle stock ... 413.54
  veneer ... 413.52
  wagon stock ... 413.54
  washing-machine tub stock ... 413.9
  window ... 413.8
  yard ... 402.4, 411., 412.
Lumber for preservative treatment ... 404.
Lump sugar ... 161.3
Luncheon meat ... 018.14
Lustrine ... 306.25
Lye ... 834.8

M

Macadam foundation for roads ... 518.23, 518.25
Macadam pavements ... 518.33, 518.34
Macaroni ... 108.41
Mace ... 154.53
Machine bolts ... 608.31
Machine screws ... 608.2
Machine tool parts and tool elements ... 765.
Machine-tool steels ... 603.32
Machine tools ... 761.
Machinery ... 700–799
Mackerel, canned ... 035.7
  pickled, salted ... 034.1
Mackinaws, cotton ... 311.95
Magnesia, milk of ... 839.39
Magnesia and rhubarb powder, anisated ... 819.1
Magnesia-asbestos plaster insulation ... 707.43
Magnesia boiler lagging ... 707.43
Magnesia cement (flooring, bases) ... 572.
Magnesia pipe covering ... 707.43
Magnesite ... 515.
Magnesium ... 695.
Magnesium alloys ... 695.
Magnesium arsenate (insecticide) ... 881.19
Magnesium compounds ... 839.39
Magnet steel, alloy ... 621.36
Magnet wire ... 715.44
Magnetic pick-ups ... 718.69
Magnetic switches, controller and switch board ... 714.11, 714.52
Magnetite ... 601.1
Magneto mountings, aeronautic ... 724.21
  automobile ... 722.32
  gasoline engine ... 705.5
  motor boat ... 725.3
  motor cycle ... 725.2
  tractor ... 729.5
Magnetos ... 719.3
Magnolia grading rules (lumber) ... 400.39
Maguey fiber ... 330.
Mahogany grading rules ... 400.35
Mail bags ... 957.12
Mailing tubes ... 954.4
Maintenance rules for machinery and equipment. (*See* index for individual machine or equipment.)
Maize meal ... 103.4

Maize oil 142.3
Malleable cast iron 611.21
Malleable-iron pipe 607.2
Malleable-iron pipe fittings 607.2
Malleable pig iron 601.24
Malleable refractories 534.12
Mallets 616.92
Malt 119.4
Malt sprouts 119.4
Malted milk 021.7
Manganese-bronze products 647.2
Manganese copper 643.1
Manganese ores 621.12
Manganese compounds 839.39
Manhole castings 611.12
Manhole covers 611.12
Manholes, concrete or brick 518.65
Manifold paper 478.22
Manila board 472.12
Manila cable 332.
Manila cardboard 474.3
Manila hemp fiber 330.
Manila rope 331.16
Manila twine 331.22
Manila wrapping paper 477.2
Manometers 919.5
Manure and manure salts 850.
Map paper 478.31
Map symbols 910.
Maple grading rules 400.36
Maple sirup 164.1
Maps 482.
Marble and marble work 511.3
Margarine, nut 142.91
Marine boilers 703.1
Marine engines, reciprocating steam 701.1
Marine equipment and apparatus 725.4
Marine glue for ship decks 505.36
Marine officers' caps 395.13
Marine sextants 916.22
Marine turbines 701.2
Marine uniforms, woolen 368.82
Marjoram 154.43
Marjoram extract 175.9
Markers, highway 998.
Marking brushes 982.2
Marking ink for fabrics 933.9
Marking-ink solvent 933.0
Marking pot, sheet metal 612.29
  tinware 681.41
Marlin twine 331.24
Marmalades 134.54
Masks, babbitting, chemical plant, chippers' 914.5
  baseball 943.3
  breathing 993.
Masonry 518.8
  ashlar 518.82
  brick 518.83
  cement rubble and mortar rubble 518.82
  concrete 518.89
  dry rubble 518.81
  stone 518.81, 518.82, 518.89
Masonry arches 518.84
Masonry cement 516.19
Mass, standards of 919.1
Matches 991.
Mathematical instruments 916.1
Mathematical symbols 910.
Mats, bath, cotton 319.3
  copper 642.62
  straw, grass, or fiber 349.1
Matting, fiber, grass, or straw 349.1
  rubber 208.1
Mattocks 616.64
Mattress cases and covers, cotton 315.14
Mattress filling, cotton 301.4
Mattress hair, curled 362.2
Mattress pads 315.10
Mattress ticking 304.8
Mattresses, cotton felt 315.11
  hair 315.13
  kapok 315.12
Maul, spike 616.8
Mayonnaise 142.94
Meal, alfalfa 112.5
  blood 098.1
  bone 098.1
  coconut 112.4
  copra 112.4
  corn 103.4
  corn germ 112.9
  corn gluten 103.4
  corn oil 112.9
  cottonseed 112.3
  crab 098.1
  fish (feed) 098.1
  flaxseed 112.1
  ivory nut 112.9
  linseed 112.1
  maize 103.4
  meat 098.1
  oat 109.4
  oil cake 112.
  palm kernel 112.9
Meal, peanut 112.2
  rice 119.5
  scrap, table 119.9
  shrimp 098.1
  velvet bean 119.9
  whole wheat 107.4
Measures, capacity, weight, length 919.1
  household 919.1
  jewelers' 919.1
Measuring apparatus 793.
Measuring devices for greases 793.7
Measuring devices for liquids 793.6
Measuring scales for weight 793.5
Measuring tanks 956.2
Measuring tapes 616.35
Measuring tools 615.8
Meat extracts 099.1
Meat meal 098.1
Meat scraps 098.1
Meats 010–018
Meats (rapid reference). (*See* index for individual meat sought.)
Mechanical communication chain 603.56
Mechanical governors 795.
Medical equipment and supplies 915.1–915.5
Medical preparations and drugs 810–819
Medicated alcohol 822.4
Medicinal oils 813.
Medicinal preparations 810–819
Medicinal soap 871.3
Medicinals, biological 812.
  coal tar 803.2
Medicinals of animal origin 819.4
Medicine chests 915.43
Medicine droppers and glasses 915.45
Megaphones 943.6
Melons, canned 134.3
  dried 133.3
  fresh 132.3
Melton 365.17
Menhaden oil 042.3
Menthol 819.9
Mercurammonium chloride 839.36
Mercuric chloride 839.36
Mercuric oxide (pigment) 842.9
Mercurous chloride 839.36
Mercurous chloride and jalap 819.1
Mercurous iodide 839.36
Mercury 652.
Mercury compounds and salts 839.36
Mercury metal, medicinal 839.36
Mercury vapor lamps 716.15
Mercury with chalk 819.1
Messenger cable, steel 603.42
Messenger clamps 719.62
Metal cement pigments 849.8
Metal door and trim 605.22
Metal fits, shaft and hole 615.82
Metal furniture and fixtures 613.
Metal lath 605.24
Metal polish 891.
Metal-protecting paints and compounds 844.1
Metal-working machinery 760–769
Metallic cloth gaskets 707.11
Metallic hose 607.7
Metallic packing 707.23
Metals, bearing 692.
  classification of 600.2
  coating of 600.3
  heat treatment of 600.5
  precious 660–669
  scrap 600.2
Metals and manufactures 600–699
Meteorological instruments 917.
Meter cabinets 715.12
Meter parts, electric meter 714.37
Meters, ampere 714.31, 714.32
  electrical 714.3
  radio-frequency 718.65
  volt 714.32, 714.33
  water 793.4
  watt, demand 714.38
  watt-hour 714.34
Methane detectors, electric 716.17
  nonelectric 997.6
Methanol 822.5
Methyl alcohol 822.5
Methyl green (biological stain) 803.19
Methyl orange (biological stain) 803.19
Methyl salicylate 813.9
Methyl violet (biological stain) 803.19
Methylene blue (biological stain) 803.19
Methylene blue (drug) 803.29
Metol 809.3
Mica, crude 551.
  electrical insulating 719.51
  manufactured 552.
Microphones, radio 718.69
Microscopes 914.3
Middlings, buckwheat 118.9
  oat 118.9
  rye 118.9
  wheat 118.3
Midland bay 111.98

- Military hairbrush 982.1
- Milk, concentrated 021.4
  - condensed 021.5
  - dry 021.7
  - evaporated 021.6
  - fresh and pasteurized 021.1
  - malted 021.7
- Milk bottles 955.1
- Milk cans 959.1
- Milk chocolate 151.3
- Milk fat 021.8
- Milk machinery 731.
- Milk of magnesia 839.39
- Milk powder 021.7
- Milk sugar 161.7
- Milk-sugar feed 119.9
- Mill feeds 118.
- Millboard (paper board) 472.94
- Millboard, asbestos 545.2
- Milled rice 105.1
- Milled toilet soap 871.13
- Millinet 317.2
- Milling cutters 765.
- Milling hobs 765.
- Milling machines 761.2
- Mills, prevention of dust explosions in 789.
- Millwork 423.
- Millwork lumber 413.8
- Milo 103.5
- Mimeograph paper 475.74
- Mincemeat 018.5
- Mine cable (electric) 715.41
- Mine drainage 751.
- Mine dusting 750.
- Mine haulage cars 726.1
- Mine ladders and stairs 751.
- Mine locomotives 721.1
- Mine machinery and equipment 751.
- Mine timbers 412.0
- Mine ventilation, code for 750.
- Mineral feeds 119.9
- Mineral filler (paving) 512.16
- Mineral seal oil 503.6
- Mineral spirits (turpentine substitute) 848.7
- Mineral spirits of petroleum 503.2
- Mineral waters 176.
- Mineral waxes 506.
- Minerals, nonmetallic 500–599
- Minerals, nonmetallic (rapid reference). (*See* index for individual nonmetallic material desired.)
- Miners' lamps, electric 716.17
  - nonelectric 997.6
- Mines, coal, rock dusting in 750.
- Mining machinery 751.
- Mirrors 527.
  - surgeons' 915.24
- Miter boxes 616.31
- Mittens, athletic 068.1
  - cotton cloth 311.93
  - fur 075.3
  - leather 068.6
- Mitts, athletic 943.2
- Mixed hay 111.5
- Mixed nuts 135.8
- Mixers, concrete 742.
  - dough 786.
- Mixing valve 607.6
- Moccasins 067.4
- Mode duck 303.91
- Moellons 043.0
- Mohair serge 365.97
- Moisture testing of grains 100.
- Molasses, New Orleans 163.2
  - Porto Rico 163.1
- Mold wash, silica 593.
- Molded insulating materials 719.58
- Molding (lumber) 411.42
- Molding, automobile body, aluminum 631.22
  - electrical 715.11
- Molding paper, stereotype 476.25
- Molding sand, tests of 512.10
- Molds, ice cream 785.2
- Molybdenum compounds 837.3–837.9
- Molybdic acid 821.9
- Molybdic acid anhydride 821.9
- Molybdic oxide 837.3
- Momie cloth 308.7
- Monel-metal products 654.
- Monuments 518.85
- Mooring bitts, cast iron 611.13
  - cast steel 611.49
- Mooring pipes, ship 725.41
- Mop sticks 983.1
- Mops 983.
- Mops (wipers and polishing cloths) 319.4
- Morphine 811.
- Morphine acetate 811.
- Morphine hydrochloride 811.
- Morphine sulphate 811.
- Mortar, heat insulating 534.12
- Mortars 516.3
  - laboratory 918.6
- Mosaic, ceramic 534.25
- Mosquito netting 317.1
- Moss 292.
- Motion-picture cable 715.41
- Motion-picture cameras 911.1
- Motion-picture film 911.2
- Motion-picture projectors 912.
- Motor accessories and parts, electric 711.4
- Motor-boat engines 705.2
- Motor-boat lamps, electric 716.12
- Motor boats 725.3
- Motor cars, railway 726.1
- Motor-coach lighting 716.39
- Motor-control equipment, electric 714.11
- Motor-cycle lamp lenses 525.4
- Motor-cycle tires 206.2
- Motor cycles 725.2
- Motor fire apparatus 722.2
- Motor generators (electric) 713.4
- Motor mountings, automobile starter 722.32
- Motor starters, electric motor 714.11
- Motor-truck scales for railway use 793.5
- Motor trucks, electric 721.2
  - except electric 722.
- Motor vehicles 720–726
- Motors, alternating current 711.21
  - automobile starting 711.22
  - crane, alternating current 711.21
    - direct current 711.22
  - direct current 711.22
  - electric 711.2
    - for hazardous locations 711.25
  - elevator, alternating current 711.21
    - direct current 711.22
  - explosion proof 711.25
  - fan, direct current 711.22
  - fire pump, alternating current 711.21
    - direct current 711.22
  - fractional horsepower, alternating current 711.21
    - direct current 711.22
  - high frequency 711.21
  - induction 711.21
  - marine propulsion, alternating current 711.21
    - direct current 711.22
  - railway, electric 711.3
  - railway signal 718.41
  - single phase 711.21
  - squirrel cage 711.21
  - steel mill, alternating current 711.21
  - synchronous 711.21
  - universal 711.21, 711.22
- Mottling brushes 982.2
- Mowers, except lawn mowers 732.
  - lawn 616.73
- Mucilage 932.5
- Mucklucks 067.5
- Mufflers, knit, woolen 367.5
  - rayon 397.15
  - woven, silk 376.
- Mules 005.1
- Muriatic acid 821.3
- Mushroom catchup 129.12
- Mushrooms, canned 128.3
  - fresh 124.3
- Music 482.
- Music paper 475.75
- Music rolls 922.
- Musical instruments 920–929
- Muslins 304.6
- Mustard 154.54
- Mustard greens, canned 125.9
  - fresh 121.9
- Mustard oil 813.9
- Mutton, prepared or preserved 018.3
- Mutton carcasses 014.3
- Mutton loins 014.2
- Mutton suet 043.1
- Myrcia oil 813.9
- Myristica oil 813.9

N

- Nail pullers 616.42
- Nailing machinery 781.
- Nails 608.11, 608.12
- Nainsook 306.15
- Name-plate zinc 683.2
- Naphtha 503.3
- Naphtha cans 959.1
- Naphtha soap 871.24
- Naphthalene 801.4
- Naphthalene insecticide 881.28
- Naphthol 801.4
- Naphthol yellow S (food dye) 803.13
- Napkins, cotton 316.2
  - hospital 915.54
  - linen 339.3
  - paper 476.31
  - sanitary 319.95
- Natural cement 516.12
- Natural-gas gasoline 503.3
- Nautical instruments 919.6
- Naval brass rods 645.11
- Naval brass tubes 645.24
- Navigational symbols, marine and aerial 910.
- Neat's-foot oil 041.4
- Neckties, silk 375.1

Neckyokes, wagon 413.54
Needles, hypodermic, dental 915.10
    medical 915.27
Negative preservers (envelope) 494.
Neoarsphenamine 814.2
Net, fish 317.4
  hay 317.5
  head 317.6
  silk 378.
  tennis 317.7
  volley ball 317.7
Netting, mosquito 317.1
  wire 603.43
News board 472.13
Newspaper 475.5
Newsprint 475.5
Nickel and nickel products 653.
Nickel-bronze products 655.
Nickel chemical compounds 839.39
Nickel-chrome alloy products 656.
Nickel-chromium wire and ribbon 715.43
Nickel-copper alloy products 654.
Nickel-copper-zinc alloy products 655.
Nickel metal 653.1
  medicinal 839.39
Nickel plating 600.3
Nickel-silver products 655.
Nicotine insecticides 881.24
Nightgowns, cotton 312.2
Nile blue sulphate (biological stain) 803.19
Nipples, pipe, brass 645.4
    steel 607.4
    wrought iron 607.3
Nitric acid 821.5
Nitrocellulose 846.5
Nitrogen monoxide 839.45
Nitrogenous fertilizer materials 851.
Nitroglycerine, explosive 862.
  medicinal 819.9
Nitrohydrochloric acid 821.9
Nitrous oxide 839.45
Nonmetallic minerals 500–599
Nonmetallic minerals (rapid reference). (*See* index for individual nonmetallic material desired.)
Noodles 108.42
Novocaine 811.
Nozzles, down-spout, brass 645.4
  fire hose 974.2
Numbering machines 932.1
Numbers, preferred 910.
Nursery stock 250–259
Nut margarine 142.91
Nut stock, steel 603.21
Nutmeg 154.55
Nutmeg extract 175.9
Nuts, almond 135.1
  bolt 608.32
  Brazil 135.9
  butternut 135.9
  chestnut 135.2
  coconut 135.3
  edible 135.
  filbert 135.4
  hickory 135.9
  ivory 291.
  mixed 135.8
  peanut 135.5
  pecan 135.6
  ship propeller 725.42
  tagua 291.
  track bolt 606.4
  vegetable 291.
  walnut 135.7
Nux vomica 811.
Nux vomica extract powder 819.1

O

Oak grading rules 400.37
Oakum 331.4
Oars 428.3
Oat flour 104.2
Oat hay 111.2
Oat middlings 118.9
Oat shorts 118.9
Oat straw 113.2
Oatmeal 109.4
Oats 104.1
  rolled 109.4
Obstetrical bags, rubber 204.22
Ocher (pigment) 841.5
Odometers 793.1
Office devices and supplies 932.
Office furniture, metal 613.2–613.9
  wooden 435.
Office machines 932.1
Offices, lighting of 716.30
Offset paper 475.76
Oil, almond 813.4
  aniline 802.2
  animal, medicinal 813.9
  anise 813.9
  anthracene 801.3
  benne 142.8
  bergamot 813.9
  birch tar, rectified 813.9
  bitter almond 813.4
  bitter orange 813.9
  cade 813.9
  Cajuput 813.9
  caraway 813.9
  cardamom 813.9
  castor, medicinal 813.1
    nonmedicinal 142.2
  chaulmoogra 813.9
  chenopodium 813.9
  china wood 848.2
  cinnamon 813.9
  clove 813.9
  coal-tar distillate 801.3
  coal-tar paving 801.3
  coconut 142.1
  cod 042.1
  cod liver 042.2
    medicinal 813.2
  colza 142.8
  copra 142.1
  coriander 813.9
  corn 142.3
  cottonseed 142.4
    medicinal 813.3
  creosote 801.3
  croton, medicinal 813.9
  cutting 041.3, 504.7
  door check and door closer 504.36
  dwarf-pine-needle 813.9
  eucalyptus 813.9
  fennel 813.9
  fish (paint material) 848.5
  flaxseed 143.2
  fuel 503.4
  gingilli 142.8
  herring 042.3
  insulating 504.8
  juniper 813.9
  lard 041.3
  lavender, as food product 142.96
    medicinal 813.9
  lemon, as food product 142.97
    medicinal 813.9
  linseed 143.1
    boiled, for paint 848.12
    medicinal 813.5
    raw, for paint 848.11
  long-time-burning 503.7
  lubricating, aircraft engine 504.23
    automobile 504.34
    car-axle generator 504.12
    chain 504.19
    clock 504.35
    compressor 504.21
    crank case 504.34
    cylinder 504.2
    Diesel engine 504.23
    dynamo 504.31
    forty-five degrees below zero 504.19
    gear 504.19
    gun 504.19
    heavy asphaltic 504.11
    ice machine 504.21
    internal-combustion engine 504.23
    journal box 504.13
    machine 504.31
    machine gun 504.32
    marine engine 504.22
    pump 504.31
    reclaimed 504.13
    sewing machine 504.35
    signal 503.7
    steam cylinder 504.22
    steam engine 504.22
    steam turbine 504.22
    transmission 504.34
    typewriter 504.35
    valve 504.24
    wire rope 504.19
    zero Fahrenheit 504.19
  maize 142.3
  menhaden 042.3
  mineral seal 503.6
  mustard 813.9
  myrcia 813.9
  myristica 813.9
  neat's-foot 041.4
  oleo 041.2
  olive 142.5
    medicinal 813.6
  orange 142.97
  orange flower 813.9
  paint 848.
  palm 142.5
  paraffin 504.53
  paving 505.2
  peanut 142.6
  peppermint 813.9
  perilla 848.4
  pimenta 813.9
  pine 211.3
  pine needle 211.3
  pine tar 211.2

Oil, poppy seed 142.7
  rapeseed 142.8
  recoil, for guns 504.33
  recuperator, for guns 504.33
  road 505.2
  rosemary 813.9
  salad 142.94
  Santal 813.9
  sassafras 813.9
  sesame 142.8
    medicinal 813.7
  soybean 143.2
  spearmint 813.9
  sperm 041.1
  sunflower 142.7
  sweet birch 813.9
  switch 504.87
  tar 505.3
    medicinal 813.9
  teaberry 813.9
  teel 142.8
  theobroma 813.8
  thyme 813.9
  transformer 504.8
  tung 848.2
  turpentine 211.1
    medicinal 813.9
  varnish 848.
  whale 041.1
  wintergreen 813.9
Oil and soap sprays (insecticides) 881.22
Oil asphalt 505.14
Oil burners, domestic 614.9
  power plant 703.9
Oil cake, coconut 112.4
  corn 112.9
  cottonseed 112.3
  flaxseed 112.1
  linseed 112.1
  peanut 112.2
Oil cake meal. (*See* Oil cake.)
Oil cans 959.1
Oil cases, wooden 953.36
Oil circuit breakers 714.51
Oil engines 704.1
Oil for cold application to roads 505.21
Oil for hot application to roads 505.22
Oil gages 793.2
Oil grain leather 061.5
Oil hose 202.22
Oil lamps 997.1
Oil-proof electrical windings 719.59
Oil ranges 614.3
Oil rigs and derricks 605.23
Oilseed cakes. (*See* Oil cake.)
Oilseeds 141.
Oil stoves 614.3
Oil tanks, concrete 518.71
  steel 605.23
Oil water heaters 614.3
Oil-well machinery 754.
Oilcloth 392.6
Oiled clothing 392.53
Oiled manila tympan paper 479.4
Oiled squam hats 395.26
Oilers, brass 645.5
Oils, animal 041.
  fish 042.
  fuel 503.4
  gas 503.4
  illuminating 503.5–503.7
  insulating 504.8
  lubricating 504.1–504.9
  lubricating (rapid reference). (*See* index under oil, lubricating.)
  medicinal 813.
  medicinal (rapid reference). (*See* index under oil for the individual oil desired.)
  sulfonated (sulphated) 040.
  vegetable 142.
  vegetable (rapid reference). (*See* index under oil for the individual oil desired.)
Oilskin coat 392.53
Oilstones 541.2
Okra, fresh 122.14
Oleic acid 821.9
Oleo oil 041.2
Oleomargarine 142.91
Olive-drab cloth, woolen 365.24
Olive oil, as food product 142.5
  medicinal 813.6
Olive pigments 842.85
Olives, pickled or preserved 129.11
  ripe 131.4
Onions, canned 127.3
  fresh 123.3
Onionskin paper 478.23
Openings, wall, fire protection of 518.50
  tool post, lathe 765.
  wrench 615.42
Operating gowns, cotton 311.7
Operating pads, surgical, rubber 204.53
Operating rules for machinery and equipment. (*See* index for individual machine or equipment.)
Operators, sash 617.5
  scuttle 617.9
  skylight 617.9
  transom 617.5
Opium 811.
  powdered 819.1
Opium and ipecac powder 819.1
Optical goods 914.
Orange extract 175.7
Orange-flower oil 813.9
Orange juice 178.3
Orange, methyl (biological stain) 803.19
Orange oil 142.97
Orange I (food dye) 803.13
Oranges 131.25
Ordnance 619.1
Ore crushing and sorting machinery 752.
Ores, chrome 621.11
  ferro-alloying 621.1
  iron 601.1
  manganese 621.12
  silicon 621.13
  zinc 683.0
Organ lumber 413.53
Organs 923.
Organzine, silk 372.0
Orthocresol 803.24
Oscillator, radio 718.65
Osnaburg cement sacks 957.19
Osnaburg fabric 303.3
Osnaburg sugar bags 957.19
Ounce metal castings 645.21
Outerwear, cotton 311.
  woolen 368.
Outlet boxes, electrical 715.12
Outsoles 067.6
Ovens, bake, japanning and enameling 614.9
  drying 614.9
Overcoats, woolen 368.2
Overhead trolley systems 719.63
Oversupport rods, steel (trolley) 719.63
Oxalic acid 821.6
Oxgall 819.4
Oxgall extract 819.1
Oxidizing effects on copper 849.9
Oxtails 011.7
Oxyacetylene welding and cutting 767.
Oxygen 839.43
Oxygen breathing apparatus 993.
Oysters, canned 037.4
  fresh 036.1
Ozokerite 506.

P

Package handles 428.22
Packaging machinery 781.
Packing 707.2
  asbestos 707.21
  asbestos metallic cloth 707.21
  canvas 707.25
  condenser tube, cotton 707.25
    metallic 707.23
  cotton 707.25
  diaphragm, rubber 707.24
  duck 707.25
  fiber 707.28
  flax 707.22
  flexible, metallic 707.23
  gauge glass, rubber 707.24
  hydraulic, leather 707.26
  journal box, cotton 301.12
    wool 363.1
  jute 707.27
  leather 707.26
  metallic 707.23
  plastic, metallic 707.23
    nonmetallic 707.21
  rod, asbestos 707.21
    metallic 707.23
  rubber 707.24
  semimetallic 707.23
  spiral gland, rubber 707.24
  tucks 707.25
  valve stem, asbestos 707.21
Packing crates 954.36
Packing gland, ship propeller hub 725.42
Packing hay 111.99
Packing leather, hydraulic 066.2
Packing tools for-journal boxes 616.99
Pacol fiber 330.
Pad eyes, cast steel (marine) 611.49
Padding, cotton 306.23
  jute 329.1
Paddles 428.3
Padlock eyes 617.23
Padlocks 617.21
Pads, calendar 931.5
  cotton 319.7
  desk 931.5
  gauze 398.34
  goal keepers, hockey 943.96
  horseshoe, rubber 209.2
  kapok 349.4
  mattress 315.10
  rubber, surgical 204.53

Pails, fiber	951.6
fire, fiber	951.63
metal	951.64
wooden	951.65
Paint	843.–845.
antifouling	844.1
black	844.61
blue	844.62
brown	844.63
buff	844.64
calcimine	843.5
cream	844.68
drab	844.64
enamel	843.3
field coat	844.3
flat finish	843.1
gloss finish	843.2
graphite	843.7
gray	844.61
green	844.65
iron oxide and iron hydroxide	843.8
japan	843.4
lead, mixed	843.6
lithopone, interior, flat finish	843.1
gloss finish	843.2
metal protecting	844.1
olive drab	844.65
pole	844.3
priming	844.4
red	844.66
red lead	843.61
slate	844.64
stencil	844.5
straw	844.68
traffic sign	844.9
traffic zone	844.67
white	844.67
white lead	843.62
wood stain	845.
yellow	844.68
Paint brushes	982.2
Paint driers	849.1
Paint machinery	783.
Paint remover	849.4
Paint thinner	848.
Painters' dusters	982.3
Painting practice	840.
Pajamas, cotton	312.3
Palings, wood	423.5
Palm-kernel meal	112.9
Palm oil	142.5
Pamphlets	481.
Pan, dust, tinware	681.41
Pancreatin	819.4
Panel boards, electric	714.41
Panel stock, cypress	411.43
hardwood	411.43
Paneling, decorative wood	423.9
Panels, electrical distribution	714.41
jack, telephone	532.22, 718.22
switchboard	714.42
Pants, children's cotton knit	309.4
cotton	311.4
track, rayon	397.12
woolen	368.8
Paper	470–479
abrasive	541.4
absorbent	471.
asbestos	545.2
back lining (printing trade)	479.4
Bible	475.71
blotting	471.1
blue print	478.34
book	475.72
brown process (Van Dyke)	478.34
building	473.
carbon	476.21
chart	478.31
cigarette	476.22
coating	475.73
cover, coated	475.1
pasted	475.2
uncoated	475.3
drawing	478.32
bristol	473.9
duplicating	478.2
electrical insulating	719.52
envelope	478.19
filter	471.2
fish	472.91
flint	541.4
French folio	478.21
garnet	541.4
gummed	479.2
hanging (news)	475.4
index	478.19
ledger	478.13
linen	478.14
manifold	478.22
map	478.31
mimeograph	475.74
molding, stereotype	476.25
music	475.75
newsprint	475.5
offset	475.76
Paper, onionskin	478.23
papeterie	478.15
paraffin	477.5
parchment deed	478.16
pattern	476.24
photographic	478.34
plate wiping (printing trade)	479.4
printing, coated	475.6
uncoated	475.7
sand	541.4
sealing	479.2
sensitizing	478.34
sheathing	473.4
stencil	478.22
stereotype	476.25
sulphite manifold	478.22
thermal insulating	473.3
tissue	476.
electrical insulating	476.23
sheet	476.9
stereo	476.25
wax	477.5
wrapping	476.4
toilet	476.32
tracing	478.35
transfer	479.1
tympan	479.4
wall	475.5
waste, classification of	470.1
wrapping	477.
bogus	477.1
kraft	477.3, 477.4
manila	477.2
sanitary	477.5
sulphite	477.7
tissue	476.4
waterproof	477.8
writing, bond	478.11
flat	478.12
index	478.19
ledger	478.13
linen	478.14
loose-leaf	478.19
papeterie	478.15
parchment deed	478.16
railroad	478.17
safety	478.33
sulphite	478.19
U S M O	478.19
wedding	478.18
white vellum	478.19
Paper boards	472.
Paper boards (rapid reference). (*See* index under board for individual type desired.)	
Paper fasteners	932.5
Paper for abrasive papers	479.3
Paper-making machinery	782.
Paper napkins	476.31
Paper pulleys	493.
Paper toweling	471.3
Papeterie paper	478.15
Paprika	154.22
Para red (dye)	803.10
Para red (pigment)	842.86
Paracetaldehyde	824.
Parachute silk	373.21
Parachutes	724.27
Paraffin oil	504.53
Paraffin paper	477.5
Paraffin wax	504.54
Paraformaldehyde	824.
Paraldehyde	824.
Parapets, concrete, bridge	518.43
Parchment deed paper	478.16
Paris green	881.15
Paris white	841.8
Parka, cotton	311.97
fur	075.1
Parkway cable, electrical	715.41
Parsley, canned	125.4
fresh	121.4
Parsnips, canned	127.4
fresh	123.4
Partition lumber	411.41
Partition tile, clay	534.22
gypsum	514.62
Partitions, glass	521.8
metal, for toilets and showers	617.79
Partitions for buildings	518.53
Paste, almond	135.1
flour (insecticide)	881.27
fruit pit	135.9
kernel	135.9
library and office	932.5
polishing, for metals	891.
tooth	872.2
Pasted board (paper board)	472.2
Pasted chip board	472.21
Pasteurization apparatus	731.
Pasteurized cheese	022.49
Pasteurized milk	021.1
Pastry	108.2
Pastry flour	107.5
Patent leather	062.
Pattern lumber	413.6

Pattern makers' glue 093.5
Pattern paper 476.24
Patterns, dress 311.2
  foundry, wooden 429.9
Pavements, asphalt 518.37
  bituminous concrete 518.34
  bituminous macadam 518.34
  brick 518.35
  broken stone 518.33
  concrete 518.31
  gravel 518.32
  macadam 518.33
  sand clay 518.38
  stone block 518.36
  topsoil 518.38
  wood block 402.3
Paving blocks, asphalt 518.37
  stone 511.71
  wood 402.3
Paving brick 534.11
Peaches, canned 134.44
  dried 133.44
  fresh 132.44
Peanut butter 135.5
Peanut hay 111.94
Peanut meal 112.2
Peanut oil 142.6
Peanut-oil cake 112.2
Peanuts 135.5
Pearl barley 101.1
Pearls 561.
Pears, canned 134.22
  dried 133.22
  fresh 132.22
Peas, canned 126.13
  dry 126.13
  fresh 122.13
Pea-vine hay 111.95
Pecan lumber grading rules 400.39
Pecans 135.6
Pedestals, truck, railway car 605.13
Pencil holders 931.2
Pencil leads 931.1
Pencil stock lumber 413.9
Pencils 931.1
Penholders 931.2
Pens 931.3
Pepper (spice) 154.23
Peppermint extract 175.3
Peppermint oil 813.9
Peppers, canned 126.5
  fresh 122.5
Pepsin 819.4
Peptonized iron 839.34
Percale 306.19
Perchloric acid 821.9
Perennials (nursery stock) 251.
Perilla oil 848.4
Persimmons, fresh 132.46
Pestles, mortar 918.6
Petrolatum 504.6
Petroleum, crude 502.1
  medicinal 813.9
Petroleum barrels, wooden 951.13
Petroleum ether 503.1
Petroleum jelly 504.6
Petroleum products 502.2, 503., 504.
Petroleum products (rapid reference). (*See* index for Individual oil or distillation product desired.)
Petroleum spirits 503.2
Petroleum spirits (turpentine substitute) 848.7
Petticoats, cotton 312.4
Phaetons, automobile 723.14
Pharmaceutical preparations 810–819
Phenacetin 803.29
Phenobarbital 819.9
Phenol 802.1
Phenolic products, laminated (insulation) 719.58
Phenolphthalein 803.29
Phenolsulphonphthalein 803.29
Phenyl salicylate 803.29
Phloxine (biological stain) 803.19
Phonographs 924.
Phosphate cleaner 871.23
Phosphate fertilizer materials (rock) 852.
Phosphor-bronze products 647.3
Phosphor copper 643.2
Phosphor tin 682.
Phosphoric acid 821.9
Phosphorus, medicinal 839.9
Phosphotungstic acid 821.9
Photographic developer 809.3
Photographic goods 911.
Photographic paper 478.34
Phototubes 718.62
Physostigmine salicylate 811.
Piano actions and parts 922.
Piano lumber 413.53
Piano rim stock 413.52
Pianos 921.
Pickets, wooden 423.5
Pickled beef 011.95
Pickled cucumbers 129.11
Pickled fish 034.
Pickled olives 129.11
Pickled pork 012.92, 012.94
Pickled veal 011.95
Pickles 129.11
Picks 616.64
Pick-ups, magnetic 718.69
Picric acid 802.1
Picric acid (explosive) 803.31
Piers 518.59
Piezo oscillator 718.65
Pig iron 601.2
Pig lead 651.1
Pig nickel 653.1
Pig souse 018.27
Pig tin 681.1
Pigments 841., 842.
  asbestine 841.1
  barytes 841.2
  black 841.3, 842.4, 842.81
  blanc fixe 842.1
  blue 842.2, 842.61, 842.82
  blue lead 842.61
  bone black 842.4
  bronze blue 842.2
  brown 841.42, 842.83
  buff 842.84
  carbon black 842.4
  Chinese blue 842.2
  chrome green 842.5
  chrome oxide green 842.5
  chrome yellow 842.5
  cream 842.88
  cuprous oxide 842.9
  drab 842.84
  graphite 841.3
  gray 842.81
  green 842.5, 842.85
  iron oxide, brown 841.42
  iron oxide and iron hydroxide, red 841.41
  lampblack 842.4
  lead 842.6
  litharge 842.62
  lithopone 842.7
  mercuric oxide 842.9
  metal cement 849.8
  ocher 841.5
  olive 842.85
  para red 842.86
  Prussian blue 842.2
  red 841.41, 841.63, 842.86
  red lead 842.63
  sienna 841.6
  slate 842.84
  straw 842.88
  titanium oxide 842.1
  ultramarine blue 842.3
  umber 841.7
  white 841.8, 842.1, 842.64, 842.7, 842.87
  white lead 842.64
  yellow 841.5, 842.5, 842.88
  zinc oxide 842.7
  zinc sulphide 842.7
Pigskin shoe leather 061.6
Pile drivers 741.1
Piles, cedar 401.41
  chestnut 401.42
  concrete 518.42
  cypress 401.43
  fir and Douglas fir 401.44
  oak 401.45
  pine 401.46
  redwood 401.47
  wood 401.4
Piling, sheet, timber 401.49
Pillow covers and slips, cotton 315.31
Pillow ticking 304.8
Pillowcases, cotton 315.31
  rubber 204.25
Pillows, air 204.25
  cotton felt 315.32
  feather 315.33
  hair 315.35
  kapok 315.34
  rubber 204.25
Pilocarpine hydrochloride 811.
Pilocarpine nitrate 811.
Pilot ladder, ship 725.41
Pilot lamps 716.14
Pimenta oil 813.9
Pimento 154.21
Pimenton 154.22
Pimiento 154.22
Pin cups 932.3
Pin insulators, glass 526.1
  porcelain 532.22
Pinch bars 616.91
Pincers (tool) 615.31
Pine grading rules 400.26
Pine-needle oil 813.9
Pine oil 211.3
Pine tar 211.4
Pine-tar oil 211.2
Pineapples, canned 134.24
  fresh 131.5

Pinions	611.55
Pins, automobile	722.33
bowling	429.9
channel, track bond	718.49
cotter	608.51
crank, locomotive	702.9
insulator, iron and steel	719.61
wooden	429.7
piston, automobile	722.31
shaft keying	608.51
Pipe, brass	645.23
cast iron	607.1
clay	531.5
copper	642.23
culvert, cast iron	607.11
clay	531.5
concrete	518.61
sheet metal	607.5
drain, cast iron	607.11
clay	531.5
concrete	518.62
drill, steel	607.4
wrought iron	607.3
eaves, sheet metal	607.5
gas, cast iron	607.12
steel	607.4
wrought iron	607.3
line, steel (oil, gas, or water)	607.4
malleable iron	607.2
oil, steel	607.4
wrought iron	607.3
reinforced concrete	516.9
sewer, cast iron	607.11
clay	531.5
concrete	518.67
sheet iron or steel	607.5
signal, wrought iron	607.3
steel	607.4
train line	726.2
water, cast iron	607.11
steel	607.4
wrought iron	607.3
well casing, steel	607.4
wrought iron	607.3
wrought iron	607.3
Pipe covering, asbestos	707.42
cork	707.41
felt	707.44
magnesia	707.43
Pipe cutters	615.39
Pipe fittings, brass	645.4
cast iron	607.14
malleable iron	607.2
steel	607.4
wrought iron	607.3
Pipe nipples, brass	645.4
steel	607.4
Pipe stave lumber	413.9
Pipe threads	607.0
Pipe unions, bronze	646.51
sanitary	731.
Pipe valves	607.6
Pipes, dry, locomotive	702.9
mooring, ship	725.41
Pipes and smokers' outfits	994.
Pipettes	918.1
Pistol cartridges	619.1
Pistons, automobile	722.31
locomotive	702.9
Pitch, tar	505.3
Pitch filler (paving joints)	505.15
Pitch pine grading rules	400.26
Pitchers, glass	523.2
Pituitary	819.1
Pituitary solution	819.4
Pivots, sash	617.5
transom	617.5
Plane table outfits, engineers'	916.8
Planes, hand	616.16
Plank, bridge floor	412.9
creosoted, wiring conduit	427.
dimension lumber	402.43
ship	413.4
structural	412.1
Planters	732.
Plaster, adhesive (medical)	204.12
dental	915.10
gypsum	514.2, 514.3
insulation, magnesia	707.43
lime	514.4
magnesia asbestos	707.43
Portland cement	514.5
wall	514.63
Plaster board, gypsum	514.61
Plaster of Paris	514.2
Plaster of Paris bandage	398.31
Plastic fire-clay refractories	534.12
Plate glass	521.1
Plate wiping paper	479.4
Plated ware, silver	691.2
Plates, alloy steel	621.32
aluminum and aluminum alloy	631.21
aluminum bronze	647.14
anchor (pole-line hardware)	719.62
Plates, baseball	943.4
bench, tinners'	615.73
boiler, iron and steel	604.11
boiler, zinc	683.2
bone, steel	915.58
brass	644.21
bronze	646.21
ceiling, brass (plumbing)	645.4
cast iron (plumbing)	611.19
cast steel (plumbing)	611.49
chain, cast steel (marine)	611.49
condenser tube, Muntz metal	644.21
copper	641.21
copper-nickel	654.52
electrotype	788.
firebox, copper	641.21
steel	604.11
floor, brass (plumbing)	645.4
cast iron (plumbing)	611.19
cast steel (plumbing)	611.49
German silver	655.2
guy	719.62
iron	604.1
iron and steel, for ship hulls	604.13
kick	617.34
letter box	617.9
license, automobile	722.39
liner, sewer, vitrified clay	534.29
manganese bronze	647.24
Monel metal	654.52
Muntz metal	644.21
nickel	653.1
nickel bronze	655.2
nickel copper	654.52
nickel-copper-zinc alloy	655.2
nickel silver	655.2
phosphor bronze	647.33
photographic	911.2
printing	788.
push	617.34
rail joint	606.2
sash pull	617.11
steel	604.1
for brazing	604.19
for nonpressure tanks and stacks	604.12
for pressure vessels	604.11
structural steel	605.1
for forge welding	605.19
tie, railroad	606.2
wall, brass (plumbing)	645.4
cast iron (plumbing)	611.19
cast steel (plumbing)	611.49
wrought iron	604.14
zinc	683.2
Platform scales	793.5
Platforms, dumping-hoist, motor truck	722.1
skid, for freight shipments	959.9
Plating, chromium, nickel, and tin	600.3
Platinic chloride	839.39
Platinum and platinum jewelry	661.
Platinum hydrochloride	839.39
Platinum metal, medicinal	839.39
Play pipe, fire hose	974.2
Playground halls	943.1
Plier cutters	615.32
Pliers	615.32
Plowbolts	608.31
Plows	732.
Plug fuses	714.21
Plugs, battery charging	715.21
clean out, brass (plumbing)	645.4
electrical connection	715.21
fusible, for boilers	703.9
lavatory, sink, and tray, brass	645.4
radio receiver	718.69
telephone	718.29
tie, wooden	429.9
Plumbago crucibles	574.
Plumbers' chain, copper	642.9
Plumbers' force cups	209.4
Plumbic compounds	839.35
Plumbing fixtures, brass	645.4
slate	511.52
vitreous and porcelain	532.23
Plumbing fixtures index	617.7
Plumbing practice	600.6
Plumbs, carpenters'	616.32
Plums, canned	134.45
dried	133.45
fresh	132.45
Plunger pumps	755.1
Plushes, cotton	303.2
Plywood	413.52
Pneumatic hammers	615.9
Pneumatic riveters, hand	615.9
Pneumatic tires for automobiles	206.1
Pneumatic tires for motorcycles, bicycles, and airplanes	206.2
Pneumatic tool hose	202.12
Pneumatic tools, metal working	615.9
Pocket knives	612.11
Poisons, caustic, agricultural	803.4
insect stomach	881.1
Pole bands	719.62
Pole brackets, wooden	429.3

Pole guards 719.62
Pole-line hardware 719.61, 719.62
Pole paint 844.3
Pole stain (preservative) 801.3
Pole steps, metal 719.62
Pole vault standards (athletic) 943.94
Poles, cedar 401.31
  chestnut 401.32
  cypress 401.33
  fir 401.34
  oak 401.35
  pine 401.36
  redwood 401.37
  reinforced concrete 516.9
  steel tubular 607.4
  trolley 726.2
  wagon 413.54
  wood 401.3
Polish, metal 891.
Polishing brushes 982.4
Polishing cloths 319.4
Polishing paste for metals 891.
Politzer bags 204.27
Pollen, ragweed, extract of 819.9
Pomace, dried apple (feed) 119.9
Pomegranates 131.7
Pomelo 131.22
Ponceau 3R and ponceau SX (food dyes) 803.13
Ponchos 392.51
Pools, swimming 518.73
Poplar grading rules 400.39
Poppet valves, automobile 722.31
Poppy-seed oil 142.7
Porcelain crucibles 532.21
Porcelain insulators, knobs, tubes, bases, panels 532.22
Porcelain plumbing fixtures 532.23
Porcelain products 532.2
Porcelain ware, laboratory 532.21
Porch columns, turned, Douglas fir 411.9
Porch decking, cedar 411.9
Porch furniture 432.
Pork 012.
  dry pickled 012.92
  fresh 012.1–012.91
  salt pickled 012.92
  smoked 012.95
  sugar cured 012.93
  sweet pickle cured 012.94
Pork barrels 951.13
Pork carcasses 012.1
Pork hams 012.3
Pork loins 012.2
Pork products, sausage type 018.2
Pork ribs 012.4
Pork sausage 018.24
Pork shoulders 012.3
Portland cement 516.11
Portland cement plaster 514.5
Portland cement stucco 516.2
Poster panels (advertising signs) 998.
Post-office railway cars 726.1
Posts, binding, radio 718.69
  bois d'Arc 401.29
  catalpa 401.29
  cedar 401.21
  chestnut 401.22
  cypress 401.23
  fence, concrete 516.9
    metal 619.3
    wooden 401.2
  locust 401.24
  mulberry 401.29
  oak 401.25
  pine 401.26
  redwood 401.29
  screw 619.3
  structural 412.1
  tool, lathe 765.
Potash 832.3
Potash bulbs 918.9
Potassium acetate 832.4
Potassium and potassium compounds 832.
Potassium antimonyl tartrate 839.31
Potassium arsenite 832.4
Potassium bicarbonate 832.4
Potassium bitartrate 832.4
Potassium bromate 832.4
Potassium bromide 832.4
Potassium carbonate 832.2
Potassium chlorate 832.4
Potassium chloride 832.4
Potassium chromate 832.4
Potassium citrate 832.4
Potassium cyanide 832.1
Potassium dichromate 832.4
Potassium ferricyanide 832.4
Potassium ferrocyanide 832.4
Potassium hydroxide 832.3
Potassium hypophosphite 832.4
Potassium iodate 832.4
Potassium iodide 832.4
Potassium mercuric iodide 839.36
Potassium nitrate 832.4
Potassium oxalate 832.4
Potassium permanganate 832.4
Potassium phosphate 832.4
Potassium picrate 832.4
Potassium pthalate, acid 832.4
Potassium sulphate 832.4
Potassium tartrate 832.4
Potassium thiocyanate 832.4
Potato diggers, mechanical 734.
Potatoes, sweet, canned 127.52
    fresh 123.52
  white, canned 127.51
    fresh 123.51
Pothead support 719.62
Pots, earthenware and stoneware 533.3
  marking, sheet metal 612.29
  soldering 615.72
Pottery plaster, gypsum 514.3
Pouches, hospital 915.42
Poultry, killed 015.
  live 007.
Poultry feeds 117.
Powder, aloe 819.1
  antimonial 819.1
  antiseptic 819.1
  aromatic 819.1
  baking 155.1
  bayberry 819.1
  bleaching 891.
  bronze (paint) 847.
  canella 819.1
  chalk, aromatic 819.1
    compound 819.1
  chalk and opium, aromatic 819.1
  Dover's 819.1
  effervescing (Seidlitz) 819.1
  explosive 861.
  glycyrrhiza (licorice) 819.1
  gray 819.1
  Gregory's 819.1
  ink 809.2
  insect (pyrethrum) 881.26
  ipecac and opium (Dover's) 819.1
  jalap 819.1
  licorice 819.1
  mercurous chloride and jalap 819.1
  milk 021.7
  pancreatin 819.1
  pyrethrum 881.26
  rhubarb and magnesia, anisated 819.1
  rubefacient spice 819.1
  scouring 871.27
  Seidlitz 819.1
  soap 871.23
  talcum 872.1
  tooth 872.2
Powdered-coal systems for boiler plants 703.9
Powders, dusting (insecticides) 881.17
  medicinal 819.1
Power cable, electric 715.41
Power plant heating equipment 792.1
Power plant parts, aircraft 724.21
  automobile 722.31
Power presses (machine tool) 762.1
Power shovels 741.4
Power take-off, tractor 729.5
Power-transmission chains 766.1
Power-transmission machinery 766.
Power unit, radio 718.69
Prairie hay 111.93
Precious metals 660–669
Precious stones 560–569
Preferred numbers 910.
Preparations, medicinal, in tubes 819.2
Prepared meats 018.
Prescription scales and balances 793.5
Preservative treatment for wood 400.4
Preservatives, food 892.
  wood 801.3, 839.38
Preserve jars 955.4
Preserved meats 018.
Preservers, photographic negative 494.
Preserves, fruit 134.55
Press cloth, hair (oil pressing) 365.96
Pressboard 472.36
Presses, power (machine tool) 762.1
Pressing equipment, laundry 787.
Pressure gauge connections, automobile 722.33
Pressure gauges 793.2
Pressure regulators (reducing valve) 607.6
Pressure vessels, fired 703.1
  unfired 605.23
  welded 767.
Primary batteries 712.1
Priming paints 844.4
Print cloth, cotton (dress material) 306.1
  cotton (suiting) 306.35
Printed forms 489.
Printed matter 480–489
Printed tracing cloth 392.12
Printers' blankets 369.23
Printing ink 933.2
Printing machinery 788.
Printing paper, coated 475.6
  newsprint 475.5
  uncoated 475.7
Printing plates 788.

Printing varnish	846. 7
Prints, lithographic	483.
Prism glass	521. 5
Prisoners' uniform cloth	365. 94
Procaine	811.
Process cloth, cotton	308. 8
Producers, gas	756.
Profile cloth (tracing cloth)	392. 12
Profile paper	478. 35
Projectile, line carrying	619. 1
Projectile lines for line-carrying guns	619. 1
Projectors, electric light	716. 2
lantern slide	912.
motion picture	912.
Proof coil (chain)	603. 52
Proof spirit	822. 0
Propeller blades, bronze	646. 41
cast steel	611. 49
Propeller hubs, cast iron	611. 19
cast steel	611. 49
marine	725. 3
Propeller shaft couplings, boat	725. 3
ship	725. 42
Propeller-shaft mountings, automobile truck	722. 34
Propellers, aircraft	724. 24
bronze	646. 41
cast iron	611. 19
cast steel	611. 49
ship	725. 42
Propulsion motors, marine, alternating current	711. 21
direct current	711. 22
Protective apparatus for electrical equipment	715. 5
Protein, silver	839. 37
Proving rings for calibrating testing machines	919. 9
Prunes, canned	134. 45
dried	133. 45
fresh	132. 45
Pruning shears	616. 72
Prussian blue (pigment)	842. 2
Psychrometers	917. 3
Public buildings, lighting of	716. 30
Puck, ice hockey	209. 92
Puffed rice	109. 5
Puffed wheat	109. 6
Pullers, nail	616. 42
railway spike	616. 8
Pulley groove form (wire rope, manila cordage)	754.
Pulleys (builders' hardware)	617. 9
Pulleys, awning	617. 9
belt and rope	611. 16
clothesline	617. 9
dumb-waiter	617. 9
fan belt, automobile	722. 31
hothouse	617. 9
nonmetallic, aeronautic	724. 22
paper	493.
sash	617. 5
tractor	729. 5
wagon brake	617. 9
Pull-over bodies, trolley	719. 63
Pulls, door	617. 33
drawer	617. 33
knob	617. 33
Pulp, apple pectin, dried	119. 9
wood	400. 5
Pulpboard	472. 14, 472. 37
Pulp-making machinery	782.
Pulverized fuel systems for boiler plants	703. 9
Pulverizing systems, cocoa and sugar	789.
Pumice	541. 5
Pump valves, rubber	707. 3
Pumping engines, gas and gasoline	705. 3
Pumpkin, canned	126. 6
fresh	122. 6
Pumps	755.
filling station, gasoline	793. 6
fuel, automobile	722. 31
hand	755. 3
oil well	754.
Punches, hand, for leather, etc	616. 22
for metals	615. 13
Punches, track and tie plug	616. 8
Punching machines	764.
Push bars (builders' hardware)	617. 34
Push brooms	981. 63
Push buttons	718. 33
Push plates (builders' hardware)	617. 34
Putty	849. 3
Puzzolan cement	516. 19
Pyramidon	819. 9
Pyrethrum insect powder	881. 26
Pyridine bases	839. 9
Pyrogallic acid	802. 1
Pyrogallol	802. 1
Pyrometers	919. 8
Pyroxylin (explosives)	862.
Pyroxylin impregnated shade cloth	392. 22
Pyroxylin lacquer manufacturing plants	518. 59
Pyroxylin products	846. 5

Q

Quarrying machinery	751.
Quicklime	517. 2
Quillai bark	871. 24
Quinces, canned	134. 23
dried	133. 23
fresh	132. 23
Quinidine	811.
Quinidine sulfate	811.
Quinine	811.
Quinine arsenate	811.
Quinine arsenite	811.
Quinine hydrochloride	811.
Quinine sulphate	811.
Quoits	943. 5

R

Raceways for electric wiring	715. 11
Racks, fire hose	974. 3
secondary, for spool insulators	719. 61
Racquet, squash handball	943. 99
Radiator bronzing brushes	982. 2
Radiator caps, automobile	722. 33
Radiator dusting brushes	982. 3
Radiator hose	202. 43
Radiator shutters, automobile	722. 31
Radiator valves	607. 6
Radiators, automobile	722. 31
house heating	614. 4
Radio apparatus and equipment	718. 6
Radio apparatus and equipment (rapid reference). (*See* index under individual items desired.)	
Radio compass	718. 66
Radishes, canned	127. 6
fresh	123. 6
Radium bromide	839. 39
Radium in drugs	810.
Rafts	725. 3
Rag felt	365. 98
Rags, cotton, wiping	319. 4
waste	390. 5
Ragweed pollen extract	819. 9
Rail bonds	718. 49
Rail crossings, alloy steel	622. 5, 622. 9
steel	606. 3
Rail fork (tool)	616. 8
Rail-joint plates	606. 2
Rail motor cars	726. 1
Rail tie-plates	606. 2
Railings, guard, wood	402. 2
Railings for concrete bridges	518. 43
Railroad board (paper board)	474. 11
Railroad cars	726. 1
Railroad ties	401. 1
Railroad writing paper	478. 17
Rails, guard, wood	402. 2
railway, alloy steel	622. 2
steel	606. 1
sliding door	617. 9
Railway ballast	511. 73
Railway bridges, steel	605. 21
Railway car parts and fittings	726. 2
Railway cars, steam, electric, and gasoline	726. 1
Railway material classification	700.
Railway motors, electric	711. 3
Railway signals	718. 41
Railway steel bars and rods	603. 27
Railway track material, electric	719. 63
steam	606.
Railway trolley material	719. 63
Railway turntables	605. 21
Rain clothing	392. 51–392. 54
Raincoats, rubber	203. 4
Raisin bread	108. 1
Raisin trays	959. 9
Raisins	133. 13
Rakes, hand	616. 62
horse or power drawn	732.
Ramie cordage	331. 13
Ramie fabrics	334.
Ramie thread	331. 3
Range boilers	614. 1
Ranges, coal	614. 1
electric	717. 1
gas	614. 2
gasoline	614. 3
oil	614. 3
Rapeseed oil	142. 8
Raspberries, canned	134. 11
fresh	132. 11
Rasps	615. 63
Rat proofing of ships	725. 41
Ratline, hemp	331. 15
Rattan	414. 2
Rattan brooms	981. 2
Rattan furniture	439. 1
Rattler for brick testing	534. 10
Raw silk	371.
Rawhide, hard	065. 2
Rayon	397.
Rayon hosiery	397. 11
Rayon knit goods	397. 1
Rayon underwear	397. 12
Rayon yarn	397. 0
Razors and razor blades	612. 12
Reaches, wagon	413. 54
Reactor, railway track	718. 49
Reactors, electrical	713. 5

- Reading glass 914.4
- Reamers 615.14
  - electric 711.24
- Receiving apparatus, radio 718.64
- Receptacles, battery charging 715.21
  - electric 715.21
  - train line 715.21
  - waste paper, fiber 952.14
- Reciprocating steam engines 701.1
- Reclaimed lubricating oil 504.13
- Recoil oil for guns 504.33
- Record ink 933.1
- Record vaults 518.59
- Recording apparatus 793.
- Recording machine ribbons 932.2
- Rectifier tubes 718.62
- Rectifiers 713.7
- Recuperator grease 504.49
- Recuperator oil for guns 504.33
- Red, congo (biological stain) 803.19
- Red dog, rye 118.9
  - wheat 118.3
- Red ink 933.1
- Red-lead paints 843.61
- Red-lead pigments 842.63
- Red pigments 841.41, 842.63, 842.86
- Reducing valves 607.6
- Redwood grading rules 400.27
- Reed (plant stalk) 414.3
- Reed furniture 439.1
- Reels, cable and electric wire 715.36
  - trolley wire 715.36
- Refiners' sirup 163.3
- Reflectors, glass 525.2
  - headlight 716.2
  - reflex, motor vehicle 722.39
- Refractories, fire clay 534.12
  - malleable 534.12
  - silica 534.12
- Refrigerating machinery 785.
- Refrigerating systems 785.1
- Refrigerator car parts 726.2
- Refrigerators 959.4
- Refuse can 959.1
- Regain of mercerized cotton yarns 302.10
- Register chain 603.56
- Regulators, charging equipment 714.11
  - induction 713.5
- Reinforced concrete pipe 516.9
- Reinforced concrete poles 516.9
- Reinforcement wire, steel 603.41
- Reinforcing bars, steel 605.25
- Relay baton 429.9
- Relays, electric power 714.14
  - railway signal 718.43
  - track circuit 718.43
- Release valve 607.6
- Relish 129.11
- Remedies (medicinal), new and nonofficial 810.
- Remover, paint and varnish 849.4
- Renovated butter 022.2
- Repair shop, steel 605.22
- Repeater, railway signal 718.41
- Reservoirs, concrete 518.75
- Resins, other than varnish 210–217
  - varnish 846.6
- Resistance welding apparatus 767.
- Resistor wire 715.43
- Resistors 714.12
- Restaurant equipment, sheet metal 619.2
- Restaurant guest checks 489.
- Rests, shelf 617.62
- Retail fabric measuring devices 390.4
- Retaining walls 518.66
- Retarder system, railway car 718.42
- Rheostats 714.12
- Rhubarb, canned 128.4
  - fresh 124.4
- Rhubarb and magnesia powder, anisated 819.1
- Rhubarb extract 819.1
- Ribbon, heating element, electrical 715.43
  - nickel chromium 715.43
  - zinc 683.2
- Ribbons, computing and recording machine 932.2
  - hectograph 932.2
  - silk 373.1
  - typewriter 932.2
- Ribs, pork 012.4
- Rice, grain 105.1
  - puffed 109.5
  - rough, brown, and milled 105.1
- Rice bran 119.5
- Rice feed 119.5
- Rice meal 119.5
- Rice straw 113.4
- Ridge-pin support (pole-line hardware) 719.62
- Riding gloves, leather 068.4
- Rifle cartridges 619.1
- Rig irons, oil well 754.
- Rigging leather 066.8
- Rigging screws (ship) 608.7
- Rigs and derricks, oil well 754.
- Rims, airplane wheel 724.23
  - automobile tire 722.36
  - motor cycle 725.2
  - truck tire 722.36
- Ring cushions, rubber 204.25
- Rings, brass 645.32
  - bronze 645.32
  - cross connecting (pole-line hardware) 719.61
  - proving, for calibrating testing machines 919.9
- Riprap 511.72
- Rivet iron 603.1
- Rivet steel (carbon steel) 603.21
- Rivet steel (nickel steel) 621.31
- Rivet stock, brass wire 645.12
- Riveting hammers, pneumatic 615.9
- Rivets, aluminum and aluminum alloy 631.33
  - iron or steel 608.4
  - split, brass 608.4
  - tubular, brass 608.4
- Road asphalts 505.1
- Road construction 518.1–518.3
- Road oils 505.2
- Road tars 505.3
- Road-making equipment 743.
- Roads. (*See* Pavements.)
- Roadsters, automobile 723.12
- Roadway preparation 518.11
- Roast beef 018.18
- Roasted coffee 152.2
- Roasting machinery for ores 753.
- Robes, bath, woolen 368.3
  - fur 075.2
- Rock dusting of coal mines 750.
- Rock for road building 511.7
- Rod-cup grease 504.46
- Rod-end pins 608.51
- Rod ends and pins, automobile 722.33
- Rods, alloy steel 621.31
  - aluminum and aluminum alloy 631.31
  - aluminum-bronze 647.13
  - anchor 719.62
  - brass 645.11
  - bronze 646.31
  - carbon steel 603.2
  - copper 642.11
  - copper-nickel 654.53
  - German silver 655.5
  - guy 719.62
  - hinge, automobile engine hood 722.37
  - lightning 715.50
  - locomotive 702.9
  - manganese bronze 647.23
  - Monel metal 654.53
  - naval brass 645.11
  - nickel bronze 655.5
  - nickel copper 654.53
  - nickel-copper-zinc alloy 655.5
  - nickel silver 655.5
  - oversupport (trolley) 719.63
  - phosphor bronze 647.38
  - pyroxylin 846.5
  - reinforcing, steel 605.25
  - spring steel 603.33
  - steel, automotive 603.27
    - bolt stock 603.21
    - case-hardening quality 603.22
    - commercial grade 603.23
    - forging quality 603.24
    - railway 603.27
    - reinforcing 605.25
    - rivet stock 603.21
    - screw stock 603.21
    - spring 603.33
    - tool 603.32
    - welding 603.26
  - tie, track 606.6
  - Tobin bronze 645.11
  - tool steel 603.32
  - welding. (*See also* Wire, welding.)
    - aluminum and aluminum alloy 631.31
    - aluminum-bronze 647.23
    - brass 645.11
    - cast iron 611.19
    - copper 642.11
    - copper-nickel 654.53
    - Monel metal 654.53
    - nickel-copper 654.53
    - steel 603.26
  - wrought iron 603.1
- Roe, herring, canned 035.5
- Roll board, asbestos 545.2
- Rolled oats 109.4
- Roller bearings 766.2
- Roller chain 766.1
- Rollers, sash 617.5
  - shade 392.23
  - wooden 429.5
- Rolling machines (metal work) 764.
- Rolls (bread) 108.1
- Romaine, fresh 121.9
- Roof brushes 982.2
- Roof drains, cast iron 611.19
- Roof tile, clay 534.23
- Roofing, asphalt 505.16
  - gravel 505.36
  - lumber 411.7
  - railway car, wooden 413.2
  - slag 505.36
  - tar 505.36
- Roofing asphalt and shingles 505.16

Roofing felt 505. 16, 505. 36
Roofing for buildings 518. 57
Roofing gravel 512. 11
Roofing lumber 411. 7
Roofing nails 608. 11
Roofing practice, sheet metal 605. 22
Roofing sheets, iron and steel 604. 29
Roofing shingles, wood 402. 52
Roofing slate 511. 52
Roofing stone 512. 15
Roofing tar 505. 36
Roofing tile, clay 534. 23
  concrete 516. 4
Roofing tin 604. 31
Roots, greenhouse stock 251.
Rope, abaca fiber 331. 16
  cotton 302. 49
  drilling rig (manila) 331. 16
  hemp 331. 16
  jute 325. 2
  manila 331. 16
  sisal 341. 2
  wire, phosphor bronze 647. 38
    steel 603. 42
Rope for hides, sisal 341. 2
Rope for line-carrying guns 619. 1
Ropes, yoke, cotton 302. 48
Rose bengal (biological stain) 803. 19
Rosebushes 259.
Rose extract 175. 9
Roses, door lock 617. 23
Rosemary oil 813. 9
Rosettes, electric 715. 23
Rosin 216.
  varnish 846. 63
Rosin core solder 693. 1
Rotary converters, electric 713. 2
Rotary drilling tools, oil well 754.
Rotary pumps 755. 1
Round-stave baskets 952. 12
Roundels, signal 525. 3
Roving, jute 324. 1
Rowlocks 611. 23
Rubber, crude 201. 1
  reclaimed 201. 2
  scrap 201. 2
Rubber and rubber products 200–209
Rubber and rubber products (rapid reference). (*See* index for individual commodity made of rubber.)
Rubber cement 204. 92
Rubber cloth 204. 32
Rubber clothing 203.
Rubber floor covering 208. 1
Rubber goods, dental 204. 4
  surgeon's 204. 5
Rubber mill machinery 783.
Rubber sheeting 204. 33
Rubber sundries, druggists 204.
Rubber tubing 204. 6
  gas 202. 31
Rubber-covered wire, copper 715. 44
Rubberized duck 303. 94
Rubberized fabric 392. 3
Rubberized silk tape 374. 3
Rubble aggregate 512. 14
Rubble masonry 518. 81, 518. 82
Rubble stone 511. 9
Rubefacient spice powder 819. 1
Rug sizing 093. 9
Rugs, linen or flax 339. 2
  linoleum, felt base 391.
  steamer, woolen 369. 7
  woolen 366. 1
Rulers 932. 9
Rules, measuring 616. 33
Runabouts, automobile 723. 12
Running board brackets, automobile 722. 37
Rust preventive compound 844. 1
Rye, grain 106. 1
Rye bran 118. 9
Rye bread 108. 1
Rye feed 118. 9
Rye feed flour 118. 9
Rye flour 106. 2
Rye flour middlings 118. 9
Rye middlings 118. 9
Rye solubles 119. 4
Rye straw 113. 1

S

Saccharin 839. 9
Sacks, cement, Osnaburg 957. 19
  cloth 957. 1
  paper 957. 2
Saddlery 069. 2
Safes 613. 5
Safety belts and straps 069. 3
Safety chain, aluminum 631. 9
  brass 603. 56
Safety code, aeronautic 724. 3
  building exit 518. 51
  electrical 710.
  gas 607. 0
  lightning 715. 50
Safety code for abrasive wheels 541. 3
Safety code for automobile brakes 722. 38
Safety code for coal-mine transportation 750.
Safety code for coal-mine ventilation 750.
Safety code for colors for traffic signals 718. 5
Safety code for electrical equipment in coal mines 710.
Safety code for elevators and escalators 734. 3
Safety code for forging and hot metal stamping 760.
Safety code for gas-mask canisters 993.
Safety code for ladders 429. 4
Safety code for laundry machinery 787.
Safety code for logging and sawmill machinery 784. 0
Safety code for mechanical power-transmission apparatus 766. 0
Safety code for mechanical refrigeration 785. 0
Safety code for paper and pulp mills 782.
Safety code for power presses and foot and hand presses 760.
Safety code for prevention of dust explosions in coal-cleaning plants 789.
Safety code for prevention of dust explosions in flour and feed mills 789.
Safety code for prevention of dust explosions in starch factories 789.
Safety code for prevention of dust explosions in terminal grain elevators 789.
Safety code for protection of industrial workers in foundries 768.
Safety code for protection of the heads and eyes of industrial workers 914. 5
Safety code for pulverized-fuel systems 703. 9
Safety code for pulverizing systems for sugar and cocoa 789.
Safety code for rubber mills and calenders 783.
Safety code for textiles 770.
Safety code for woodworking plants 784. 0
Safety matches 991.
Safety valves 607. 6
Safety writing paper 478. 33
Saffron 154. 56
Safranin O (biological stain) 803. 19
Sage 154. 44
Sailmakers' twine 302. 35
Sails 319. 98
Sal ammoniac 831. 4
Sal soda 834. 7
Salad dressing 129. 14, 142. 94
Salad oil 142. 94
Salads, fruit 134. 56
Salicylic acid 802. 1
Salmon, canned 035. 2
Salol 803. 29
Salsify, canned 127. 7
  fresh 123. 7
Salt 154. 6
Salt bags 957. 19
Salt hay 111. 96
Salt pickled beef 011. 95
Salt pickled pork 012. 92
Salt shakers, glass 523. 3
Salt-water soap 871. 5
Salted fish 034.
Sample hay 111. 99
Sand 512. 12
  molding 512. 10
Sand bags 957. 13
Sand cement 516. 19
Sand-clay pavements 518. 38
Sand-blasting helmets 914. 5
Sand boards, wagon 413. 54
Sand-lime brick 513.
Sandpaper 541. 4
Sandstone 511. 4
Sanitary napkins 319. 95
Sanitary pipe fittings 646. 51
Sanitary wrapping paper 477. 5
Santal oil 813. 9
Santonica 221.
Sapphires 562.
Sardines, canned 035. 3
Sarsaparilla 177. 3
Sash, metal 605. 2
  wood 423. 22
Sash chain 603. 5
Sash cord, cotton 302. 46
Sash-cord irons 617. 55
Sash fastener 617. 4
Sash hardware 617. 53
Sash lifts 617. 3
Sash lock 617. 45
Sash operators 617. 53
Sash pivots 617. 5
Sash-pole hangers and hooks 617. 1
Sash-pull plates 617. 11
Sash pulleys 617. 51
Sash rollers 617. 5
Sash sheaves 617. 5
Sash-tool brushes 982. 2
Sash weights 617. 5
Sassafras oil 813. 9
Sateen 306. 2
Satin lining 373. 24
Sauce, Chili 129. 15
  tomato 129. 13
  Worcestershire 129. 13
Sauces, fruit 134. 53
Sauerkraut, bulk and canned 125. 16
Sausage, Bologna style 018. 22
  frankfurter style 018. 23
  pork 018. 24
  Vienna style 018. 25

- Sausage casings 094.
- Sausage substitute 018. 26
- Savory 154. 49
- Savory extract 175. 9
- Saw set for hand saw 615. 9
- Sawmill machinery 784.
- Saws, hack 615. 62
  - metal cutting 615. 62
  - wood, hand and power driven 616. 17
- Saybolt distilling flask 918. 9
- Saybolt test lamp 997. 1
- Saybolt viscosimeter 919. 9
- Scaffolds, wood 402. 2
- Scale preventive, boiler 882. 2
- Scales, weighing 793. 5
- Scaling hammers, pneumatic 615. 9
- Scallions 123. 3
- Scantling 402. 43
- Scarfs, knit, woolen 367. 5
  - rayon 397. 15
- Scarlet and white cloth, woolen 365. 23
- Scarlet fever streptococcus toxin and antitoxin 812.
- Schlee's green 881. 15
- Schmierkase 022. 49
- School buildings, lighting of 716. 30
- School furniture, wooden 437.
- Scientific apparatus and supplies 910–919
- Scissors 612. 13
- Scoops 616. 63
- Scouring powder 871. 27
- Scouring soaps 871. 26
- Scrap, iron and steel 600. 2
- Scrap-metal classification 600. 2
- Scrap rubber 201. 2
- Scrapers, road building 743.
  - woodworkers' 616. 16
- Scraps, meat 098. 1
- Screen fasteners 617. 43
- Screen lifts 617. 35
- Screen wire, brass 645. 39
  - bronze 646. 52
  - copper 642. 4
  - steel 603. 43
- Screenings, paper 477. 6
  - stone 512. 13, 512. 15
- Screens (furniture) 439. 2
- Screens, door 423. 1
  - grading, metal 619. 2
    - silk 379. 4
  - window 423. 2
- Screw drivers 616. 23
- Screw jacks 616. 91
- Screw machines 763.
- Screw posts 619. 3
- Screw spikes, railroad 606. 6
- Screw stock, brass 645. 11
  - steel 603. 21
- Screw-thread gages 615. 82
- Screw threads 608. 0
- Screw threads for fire-hose couplings 974. 0
- Screws 608. 2
- Scribers 615. 64
- Scrub brush 982. 3
- Scrub cloths 319. 5
- Scrubbing brooms 981. 61
- Scullery sink, steel 612. 23
- Scupper, weather deck 725. 41
- Scupper valves 725. 41
- Scuttle fastener 617. 43
- Scuttle hinges 617. 12
- Scuttle operators 617. 9
- Scythes 616. 71
- Sealing paper 479. 2
- Sealing wax, electrical insulating 719. 59
  - office 932. 5
- Seams, fabric 300. 7
- Searchlights, electric 716. 2
- Seats for water-closet bowls 532. 23
- Seaweed 292.
- Secondary rack for spool insulators 719. 61
- Sectional office furniture, metal 613. 2, 613. 7
  - wooden 435. 5
- Sedans, automobile 723. 13
- Seeds, except oil seeds and spice seeds 240–249
  - oil 141.
  - spice 154. 3, 154. 5
- Seersucker 306. 16
- Seidlitz powder 819. 1
- Seine twine, cotton 302. 32
- Selenium metal, medicinal 839. 39
- Seltzers 176. 1
- Semaphore signals, railway 718. 41
- Semibituminous coal 501. 3
- Semolina 109. 7
- Sensitizing paper 478. 34
- Separators, steam 703. 9
- Serge, mohair 365. 97
  - woolen 365. 18
- Serums 812.
- Service bracket (pole-line hardware) 719. 62
- Service stripes 369. 6
- Sesame oil, as food product 142. 8
  - medicinal 813. 7
- Set screws 608. 2
- Sets, hand saw 615. 9
- Set-up boxes for department stores 953. 2
- Sewage products as fertilizer 850.
- Sewage treatments 882.
- Sewer brick 534. 11
- Sewer liner plates, vitrified clay 534. 29
- Sewer pipe, cast iron 607. 11
  - clay 531. 5
  - concrete 518. 67
- Sewers 518. 67
- Sewing machines 775.
- Sewing silk 372. 3
- Sextants, marine 916. 22
- Shackles, aeronautic cable 603. 42
  - chain 603. 57
  - dead-ending, pole line 719. 62
- Shade cloth 392. 22
- Shade rollers 392. 23
- Shades, lighting 524.
  - window 392. 23
- Shaft ends, boat 725. 3
- Shaft fittings, automobile, serrated 722. 33
- Shaft keys 608. 52
- Shaft steel 603. 24
- Shafting, transmission 611. 52
- Shafts, alloy steel 622. 6
  - excavated, concrete lined 518. 9
  - propeller, airplane 724. 24
  - steel 611. 52
- Shakers, salt and pepper, glass 523. 3
- Shallots, fresh 123. 8
- Shallu 103. 5
- Shapes, aluminum and aluminum alloy 631. 22
  - aluminum bronze 647. 16
  - brass 644. 22
  - bronze 646. 22
  - copper 641. 22
  - copper-nickel 654. 4
  - German silver 655. 3
  - manganese bronze 647. 25
  - Monel metal 654. 4
  - nickel bronze 655. 3
  - nickel copper 654. 4
  - nickel-copper-zinc alloy 655. 3
  - nickel silver 655. 3
  - phosphor bronze 647. 35
  - steel 605. 1
    - alloy 621. 33
- Shaves, spoke 616. 16
- Shaving brushes 982. 1
- Shaving soap 871. 14
- Shearing machines (machine shop) 764.
- Shears, grass 616. 72
  - hedge cutting 616. 72
  - household and office 612. 13
  - power driven (machine shop) 764.
  - pruning 616. 72
  - tinners' 615. 33
- Sheathing, wood, end matched 411. 9
- Sheathing paper 473. 4
- Sheathing board, gypsum 564. 61
- Sheaves, sash and shutter 617. 5
- Sheep 003.
- Sheepskin leather 061. 7
- Sheepskins, raw 053.
- Sheet glass, figured, rolled 521. 4
- Sheet iron 604. 2, 604. 3
- Sheet-iron manufactures 619. 2
- Sheet-iron pipe 607. 5
- Sheet lead 651. 5
- Sheet-metal gage 604. 0
- Sheet-metal work for buildings 605. 22
- Sheet piling, timber 401. 49
- Sheet steel 604. 2, 604. 3
- Sheet-steel manufactures 619. 2
- Sheet-steel pipe 607. 5
- Sheeting, cotton 304. 7
  - rubber 204. 33
- Sheets, alloy steel 621. 32
  - aluminum and aluminum alloy 631. 23
  - aluminum bronze 647. 14
  - automobile body, aluminum 631. 23
  - brass 644. 21
  - bronze 646. 21
  - copper 641. 21
  - copper-nickel 654. 52
  - corrugated metal, for culverts 604. 29
  - cotton 315. 2
  - German silver 655. 2
  - iron 604. 2, 604. 3
  - manganese bronze 647. 24
  - Monel metal 654. 52
  - nickel 653. 31
  - nickel bronze 655. 2
  - nickel copper 654. 52
  - nickel-copper-zinc alloy 655. 2
  - nickel silver 655. 2
  - phosphor bronze 647. 33
  - pyroxylin 846. 5
  - roofing, iron and steel 604. 29, 604. 3
  - steel 604. 2, 604. 3
    - tin coated 604. 31
    - zinc coated 604. 32
  - tin 681. 2
  - zinc 683. 2
- Shelf, glass 521. 9

Shelf brackets	617.62
Shelf rests	617.62
Shellac	846.62
Shellac varnish	846.11
Shellfish, canned	037.
fresh	036.
Shells, animal	096.
gold, dental	915.10
paper shot, loaded	619.1
Shelving lumber	411.88
Sherardizing on iron and steel	600.3
Shields, eye and face, industrial	914.5
welders'	914.5
Shingle stains	845.1
Shingles, asphalt	505.16
wood	402.52
Ship decking	413.4
Ship parts and equipment (engineering)	725.42
Ship parts and equipment (hull)	725.41
Ship parts and supplies (operation)	725.43
Ship plank	413.4
Ship plates for hulls	604.13
Ship stock lumber	413.4
Ship structural steel and iron	605.15
Ship telegraphs, mechanical and electrical	718.39
Ship-lap lumber	411.5
Shipping crates (packing crates)	954.36
Shipping tags	489.
Ships	725.4
Ship's knees	401.5
Shirts, athletic cotton knit	309.4
cotton, outerwear	311.5
cotton knit (underwear)	309.4
woolen, outerwear	368.5
woolen knit, underwear	367.2
Shoe goring, elastic	394.5
Shoe knives	616.15
Shoe machinery	776.
Shoe nails	608.11
Shoe pacs and counters	067.7
Shoe tacks	608.14
Shoe thread, linen	331.3
Shoes, athletic	067.8
brake, railway	611.43
cotton cloth	311.96
horse	603.6
leather	067.1
rubber	203.12
Shooks, box	421.4
Shop or factory lumber	413.
Shopping bags	957.3
Short link, straight-link chains	603.52
Short oil varnish	846.3
Shortening, vegetable	142.95
Shorts, buckwheat	118.9
oat	118.9
wheat	118.3
Shot, copper-nickel	654.1
Monel metal	654.1
nickel	653.1
nickel-copper	654.1
shot-put (athletic)	943.94
Shot lines for line throwing guns	331.21
Shotgun shells	619.1
Shoulders, pork	012.3
Shoulders for roads	518.13
Shoveler, mechanical	751.
Shovels, hand	616.63
power	741.4
Shower bath drain	617.79
Shower bath fixtures	617.79
Shower bath inclosure, glass	521.8
marble	511.3
slate	511.52
soapstone	511.6
Shower bath partitions, metal	617.79
Shower receptor, porcelain	532.23
Shredded wheat breakfast food	109.6
Shrimp, canned	037.1
Shrimp meal	098.1
Shrubs (nursery stock)	259.
Shunts, carbon brush	715.49
Shutter bars	617.9
Shutter sheaves	617.5
Shutters, fire	605.22
radiator, automobile	722.31
tin-clad	605.22
wooden	423.3
Sickles	616.71
Sidewalk brushes	982.3
Sidewalk glass	521.7
Sidewalks, concrete	516.5
Siding, lumber	411.1
car, wooden	413.2
Sienna (pigment)	841.6
Sieves, brass	645.31
bronze	646.52
test, cement	645.31
Sifters, flour, bakery	786.
Signal cable, electric	715.41
Signal cord, cotton	302.41
Signal devices, except highway and railway	718.3
Signal hose	202.11
Signal hose gaskets	707.13
Signal lamp lenses	525.3
Signal lamp mountings, automobile	722.32
Signal lights, automobile	722.32
Signal pipe, wrought iron	607.3
Signal roundels, railway	525.3
Signal wire, copper	715.44
Signals, automatic block	718.41
emergency, railway	863.
highway	718.5
highway crossing	718.41
railway	718.41
semaphore, railway	718.41
switch operating	718.42
traffic	718.5
Signboards, except electric	998.
Signs, electric	716.31
highway crossing	718.5
Signs and signboards	998.
Silence cloths (table)	316.3
Silent chains	766.1
Silesia (dress goods)	306.24
Silica	593.
Silica brick	534.12
Silica cement	516.19
Silica mold wash	593.
Silica refractories	534.12
Silicon	839.9
Silicon carbide abrasive	541.0
Silicon-carbide abrasive cloth and paper	541.4
Silicon copper	643.3
Silicon ores	621.13
Silk, artificial, manufactures of	397.
bag	373.28
balloon	373.21
banner	373.22
bolting	373.23
braiding	372.1
broad	373.20
cartridge bag	373.24
embroidery	372.2
insulating	372.7
lining	373.25
parachute	373.21
raw	371.
sewing	372.3
spun	372.4
stencil	373.27
surgical	915.55
thrown	372.0
wash	373.29
Silk cloth	373.2
Silk crêpe	372.0
Silk organzine	372.0
Silk products	370-379
Silk products (rapid reference). (*See* index for individual commodity made of silk.)	
Silk skeins, cops or warps	372.
Silk tram	372.0
Silk twist	372.5
Silk velvet	373.26
Silk wearing apparel	375.
Sill cock	607.6
Sills, wood, structural	412.1
Silo staves	413.1
Silver	691.
Silver compounds and salts	839.37
Silver lace	399.9
Silver metal, medicinal	839.37
Silver polish	891.
Silver products	691.
Silver proteinates	839.37
Silver solder	693.3
Silver voltameter	714.39
Silverware	691.2
Singletrees, wagon	413.54
Sink bibb	607.6
Sink plug, brass	645.4
Sink traps, brass	645.4
Sinks, porcelain	532.23
slate	511.52
soapstone	511.6
steel and cast iron	612.23
Sirens	718.34
Sirup, blended	164.3
cane	164.4
corn	164.2
maple	164.1
refiners'	163.3
sorghum	164.5
sugar	164.6
Sisal fiber	330.
Sisal rope and twine	341.2
Sizings for fabrics	390.6
Skid platforms for freight shipments	959.9
Skimmed-milk feed	021.9
Skins (raw) except furs	050-059
Skirts, woolen	368.4
Skylight glass	521.7
Skylight operators	617.9
Skylights, metal frame	605.22
Slab zinc	683.1
Slabs, alloy-steel	621.31
bridge, concrete	518.44
copper	641.11
steel	602.2
Slack barrels	951.13

- Slack staves, barrel 421. 2
- Slag, broken 512. 2
- Slag foundation for roads 518. 28
- Slag roofing 505. 36
- Slat blinds 423. 3
- Slate, blackboard 511. 51
  - building 511. 52
  - granular 511. 52
  - plumbing 511. 52
  - roofing 511. 52
  - switchboard 511. 53
- Slate floors for buildings 518. 56
- Slate for electrical purposes 511. 53
- Slate pigments 842. 84
- Slate plumbing fixtures and inclosures 511. 52
- Slate roofs 518. 57
- Slats 423. 4
- Slaughter cattle 001. 2
- Slaughter hogs 002.
- Slaughter lambs 003.
- Sledge hammers 615. 22
- Sleds 729. 6
- Sleeves, copper 642. 13
  - dredging, rubber 209. 1
  - lead 651. 4
- Sleeving, cotton 319. 93
- Sleighs, bob 729. 6
- Slickers 392. 52
- Slicks, woodworkers' 616. 13
- Sliding door rails 617. 9
- Slings, cargo handling 603. 52
  - chain 603. 52
  - cloth 399. 4
- Slip joints, copper (steam pipe) 642. 9
- Slippers, felt 368. 6
  - leather 067. 3
  - woolen 368. 6
- Slip soles 067. 6
- Slop hoppers, slate 511. 52
- Slop sinks, cast iron 612. 23
  - porcelain 532. 23
- Sluice gates, cast iron 611. 13
- Smallpox vaccine 812.
- Smelting machinery 753.
- Smoked beef 011. 94
- Smoked fish 034.
- Smoked pork 012. 95
- Smoked veal 011. 94
- Smokeless powder 861.
- Smokeless powder cotton 301. 6
- Smokers' outfits 994.
- Snap switches 715. 22
- Snips 615. 33
- Soap 871.
  - automobile 871. 4
  - benzene 871. 24
  - Castile 871. 11
  - dry-cleaning 871. 7
  - floating, white 871. 15
  - grit, hand 871. 19
  - grit cake 871. 26
  - harness 871. 6
  - kitchen 871. 21
  - laundry 871. 21
    - liquid 871. 24
  - medicinal 871. 3
  - naphtha 871. 24
  - salt water 871. 5
  - scouring 871. 26
  - scrubbing 871. 26
  - shaving 871. 14
  - soft 871. 3
  - surgical 871. 3
  - toilet 871. 1
    - liquid 871. 12
    - milled 871. 13
- Soap and oil sprays (insecticides) 881. 22
- Soap chips 871. 22
- Soap kettles, laundry 787.
- Soap powder 871. 23
- Soap stock 871. 0
- Soapbark 871. 24
- Soapstone 511. 6
- Soapstone inclosures for water-closets and baths 511. 6
- Soapstone sinks and laundry trays 511. 6
- Soccer ball 069. 1
- Socket power units for radio-receiving sets 718. 69
- Sockets, electric lamp 715. 21
  - vacuum tube, radio 718. 69
  - wire rope 603. 42
- Socks, cotton 309. 2
  - rayon 397. 1
  - silk 375. 2
  - woolen 367. 1
- Soda, baking 155. 2
  - caustic 834. 8
  - hydrated 834. 7, 834. 8
  - sal 834. 7
  - washing 834. 7
- Soda ash 834. 4
- Soda crackers 103. 3
- Sodium acetate 834. 9
- Sodium and sodium compounds 834.
- Sodium arsenate, insecticide 881. 13
  - medicinal 834. 9
- Sodium arsenite, insecticide 881. 13
- Sodium auro chloride 839. 39
- Sodium benzoate 834. 9
- Sodium bicarbonate 834. 5
- Sodium biphosphate 834. 9
- Sodium bismuthate 834. 9
- Sodium bisulphate 834. 9
- Sodium bisulphite (bleach) 891.
- Sodium bisulphite (reagent) 834. 9
- Sodium bitartrate 834. 9
- Sodium borate 834. 3
- Sodium bromide 834. 9
- Sodium cacodylate 834. 9
- Sodium carbonate 834. 4
- Sodium chloride 834. 9
- Sodium citrate 834. 9
- Sodium cyanide 834. 1
- Sodium cyanide (fumigant) 881. 34
- Sodium fluoride 834. 9
- Sodium glycerophosphate 834. 9
- Sodium hydroxide 834. 8
- Sodium hypophosphite 834. 9
- Sodium indigotindisulphonate 834. 9
- Sodium iodide 834. 9
- Sodium metal 834. 9
- Sodium nitrate 834. 2
- Sodium nitrite 834. 9
- Sodium oxalate 834. 9
- Sodium perborate 834. 9
- Sodium peroxide 834. 9
- Sodium phosphate 834. 9
- Sodium platino chloride 839. 39
- Sodium pyroborate 834. 3
- Sodium salicylate 834. 9
- Sodium silicate 834. 6
- Sodium sulphate 834. 9
- Sodium sulphide 834. 9
- Sodium sulphite 834. 9
- Sodium sulphocarbolate 834. 9
- Sodium tartrate 834. 9
- Sodium thiosulphate 834. 9
- Soft soap 871. 3
- Softwood airplane stock 413. 31
- Softwood lumber 402. 7
- Softwood lumber grading rules 400. 2
- Soil can 959. 1
- Soil pipe, cast iron 607. 11
  - clay 531. 5
  - concrete 518. 67
- Soils 594.
- Solder, aluminum 693. 4
  - brazing 693. 2
  - bronze 693. 2
  - copper-zinc 693. 2
  - lead-tin 693. 1
  - rosin core 693. 1
  - silver 693. 3
  - spelter 693. 2
- Soldering coppers 615. 71
- Soldering irons 615. 71
- Soldering lugs 715. 34
- Soldering pots 615. 72
- Sole leather 063.
  - hemlock tanned 063. 3
  - oak tanned 063. 6
  - vegetable tanned 063. 6
- Soles, cut leather 063. 6
- Solid-tire base bands, automobile 722. 36
- Solid tires for automobiles and trucks 206. 5
- Solubles, rye and corn 119. 4
- Solvent, marking ink 933. 0
  - Stoddard dry-cleaning 503. 2
- Sorghum sirup 164. 5
- Sorghums, grain 103. 5
- Sorgo, freed 103. 5
- Sound recording and reproducing apparatus 718. 7
- Soups 129. 2
- Sours, laundry 871. 25
- Souse, pig 018. 27
- Southern-pine grading rules 400. 26
- Southwester hats 395. 25
- Soybean hay 111. 99
- Soybean oil 143. 2
- Soybeans, dry 126. 11
- Space heaters, gas 614. 2
- Spades 616. 63
- Spaghetti 108. 43
- Spar varnish 846. 21
- Spark plugs 719. 4
- Spatulas 918. 87
- Speakers, loud, radio 718. 69
- Spearmint extract 175. 9
- Spearmint oil 813. 9
- Specific-gravity flask 918. 9
- Speedometers 793. 1
- Spelter 683. 1
- Spelter solder 693. 2
- Spencer roll 018. 17
- Sperm oil 041. 1
- Sphygmomanometers 915. 25
- Spices, allspice 154. 21
  - anise 154. 31
  - capers 154. 41
  - caraway 154. 52
  - cardamom 154. 51

- Spices, cayenne pepper 154.23
  - celery seed 154.32
  - chili pepper 154.23
  - cinnamon 154.11
  - cloves 154.42
  - coriander seed 154.33
  - cumin seed 154.34
  - curcuma 154.19
  - curry 154.9
  - dill seed 154.35
  - fennel seed 154.36
  - ginger 154.12
  - mace 154.53
  - marjoram 154.43
  - mustard 154.54
  - nutmeg 154.55
  - paprika 154.22
  - pepper 154.23
  - pimento 154.21
  - pimenton 154.22
  - pimiento 154.22
  - saffron 154.56
  - sage 154.44
  - savory 154.49
  - tarragon 154.49
  - thyme 154.45
  - turmeric 154.19
- Spiegeleisen 621.22
- Spike maul 616.8
- Spike puller 616.8
- Spikes, nail 608.15
  - track 606.5
- Spillways 518.76
- Spinach, canned 125.5
  - fresh 121.5
- Spirits, mineral 503.2
  - mineral (turpentine substitute) 848.7
  - petroleum 503.2
  - petroleum (turpentine substitute) 848.7
  - proof, alcoholic 822.0
- Spirits of turpentine 813.9
- Splice bars, railroad 606.2
- Splicers, trolley wire 719.63
- Splicing sleeve, copper 642.13
- Spline fittings, automobile 722.33
- Split rivets 608.4
- Spoke shaves 616.16
- Spokes, motor cycle 725.2
- Sponge cups 932.3
- Sponges, fiber 293.
  - natural 097.
- Spool strap (insulator support) 719.62
- Spools, wire 715.36
- Sporting goods 943.
- Spot welding 767.
- Spouting (eave), sheet metal 607.5
- Spray hose 202.42
- Spraying machines 733.
- Sprays, asparagus (florist material) 259.
  - soap and oil (insecticides) 881.22
- Spreaders, fertilizer 733.
- Spring covers (bed spring) 315.6
- Spring hinges 617.12
- Spring rebound clips, spacers, and bolts 611.54
- Spring rollers, shade 392.23
- Spring scales 793.5
- Spring steel, alloy 621.34
- Spring steel bars and rods 603.33
- Spring steel sheets 604.24
- Spring wire, brass 645.12
  - phosphor bronze 647.38
- Springboards 429.9
- Springs, alloy steel 622.7
  - bed 613.1
  - steel 611.54
- Sprinkler fittings, cast iron 607.14
- Sprinkler systems, automatic 976.
- Sprinkling can 959.1
- Sprocket cutters 765.
- Sprocket wheels 766.1
- Sprouts, malt 119.4
- Spruce grading rules 400.28
- Spun silk 372.4
- Square fittings, automobile 722.33
- Squares (lumber) 402.43
- Squares, carpenters' 616.34
- Squash, canned 126.6
  - fresh 122.6
- Squash handball ball 943.1
- Squash handball racquet 943.99
- Squilgees 209.5
- Squirt oil can 959.1
- Stags, cattle 001.2
- Stains, biological 803.19
  - coal-tar 803.1
  - fabric, removal of 787.
  - paint 845.
  - pole (preservative) 801.3
  - shingle 845.1
  - wood, in oil 845.3
    - in turpentine 845.2
- Stair step lumber 411.9
- Stairwork, wooden 423.9
- Stairs, mine 751.
- Stake pockets, flat car 726.2
- Stakes, bench, tinners' 615.73
  - wood, sawn 402.1
- Stamp-pad ink 933.4
- Stamped ware, copper 642.5
  - German silver 655.6
  - iron and steel 612.22, 612.29
  - nickel-bronze 655.6
  - nickel-copper-zinc alloy 655.6
  - nickel-silver 655.6
  - tin 681.41
- Stamping brush 982.9
- Standards, jump and pole vault 943.94
- Stands, calendar, desk 931.5
  - hospital 915.46
  - office, wooden 435.3
- Stannous chloride 839.39
- Staples 608.13
  - hasp 617.13
- Star anise extract 175.9
- Starch 281.
  - corn 103.3
- Starch cookers, laundry 787.
- Starch factories, prevention of dust explosions in 789.
- Starch sugar 161.6
- Starters, electric motor 714.11
- Starting cable, automobile 715.41
- Starting cranks, automobile 722.31
- Starting motor mountings, automobile 722.32
- Stationery holder, wooden 435.5
- Stations, automatic, electrical 714.13
- Stave baskets, round 952.12
- Stave lumber, pipe 413.9
- Staves, barrel, slack 421.2
  - tight 421.1
  - concrete 518.59
  - silo 413.1
  - tank 413.1
- Stay-bolt copper bars 641.12
- Stay-bolt iron 603.1
- Stay-bolt stock, steel 603.21
- Stay bolts, boiler 608.31
- Steam, quality determination of 703.0
- Steam bronze castings 646.41
- Steam connections for railway cars 726.2
- Steam engines, reciprocating 701.1
- Steam heating for houses 614.4
- Steam hose 202.44
- Steam separators 703.9
- Steam shovels 741.4
- Steam traps 703.9
- Steam turbines 701.2
- Steam unit heaters 792.1
- Steamboats 725.4
- Steamer rugs, woolen 369.7
- Stearic acid 821.9
- Stearine 045.
- Steel, automotive bar 603.27
  - billet 602.2
    - alloy 621.31
  - boiler plate 604.11
  - bolt stock 603.21
    - alloy 622.1
  - case-hardening quality 603.22
  - cast 611.41
    - alloy 622.5
  - commercial bar 603.23
  - concrete reinforcement 605.25
  - drawing and forming quality 604.23
  - forged 611.51
    - alloy 622.6
  - forging quality 603.24
  - magnet, alloy 621.36
  - nut stock 603.21
  - plate 604.1
    - alloy 621.32
  - rail 606.1
    - alloy 622.2
  - railway bar 603.27
  - rivet 603.21
  - roofing 604.3
  - screw stock 603.21
  - sheet 604.2
    - alloy 621.32
    - tin coated 604.31
    - zinc coated 604.32
  - ship plate 604.13
  - spring 603.33
    - alloy 621.34
  - structural 605.
    - alloy 621.33
    - for bridges 605.11
    - for buildings 605.12
    - for cars and locomotives 605.13
    - for machinery 605.14
    - for ships 605.15
  - tank plate 604.12
  - tool, alloy 621.35
    - drill 603.31, 603.32
- Steel alloying ores and alloying mixtures 621.1, 621.2
- Steel products 600–622
- Steel products (rapid reference). (*See* index for individual commodity made of steel.)
- Steel scrap 600.2
- Steer hides, leather 061.8
  - raw 051.

- Steering-wheel tests, automobile 722. 38
- Steers 001. 2
- Stencil brushes 982. 2
- Stencil paints 844. 5
- Stencil paper 478. 22
- Stencil silk 373. 27
- Stepping (lumber) 411. 9
- Steps, pole, metal 719. 62
    - wooden 429. 3
- Stereotype paper 476. 25
- Sterilizers, electric 717. 1
    - medical 915. 32
- Sterling silver 691. 0
- Stethoscopes 915. 26
- Stick control, airplane 724. 25
- Sticks, hockey 429. 9
- Stitches and stitching 300. 7
- Stockings, cotton 309. 2
    - rayon 397. 11
    - silk 375. 2
    - woolen 367. 1
- Stoddard solvent 503. 2
- Stomach tubes, rubber 204. 54
- Stone, abrasive 541. 2
    - ashlar 511. 9
    - broken 512. 15
    - cast 516. 4
    - concrete architectural 516. 4
    - riprap 511. 72
    - rubble 511. 9
    - Telford, for roads 518. 22
- Stone-block pavements 518. 36
- Stone blocks 511. 71
- Stone masonry 518. 81, 518. 82, 518. 89
- Stone screenings 512. 13, 512. 15
- Stones, artificial, dental 915. 10
    - imitation 560–569
    - precious 560–569
- Stoneware 533.
- Stoneware bowls 533. 1
- Stoneware pots 533. 3
- Stools, camp, wooden 438. 3
    - metal 613. 3
    - office, wooden 435. 2
- Stopcocks, laboratory 918. 9
- Stoppers, cork 425. 1
    - rubber 204. 95
- Stops, door 617. 44
- Storage batteries 712. 2
- Storage-battery cases 712. 3
- Storage-battery jars and covers 712. 3
- Storage-battery terminals 712. 9
- Storage bins and hoppers 959. 7
- Storage rooms for film 518. 50
- Storage tanks, concrete 518. 71
    - steel 605. 23
- Storax 214.
- Store buildings, concrete 518. 51
- Store furniture and fixtures, wooden 436.
- Stores, lighting of 716. 30
- Stove-bolt nuts 608. 32
- Stove bolts 608. 31
- Stove wire, copper 715. 44
- Stoves, coal 614. 1
    - electric 717. 1
    - gas 614. 2
    - gasoline 614. 3
    - kerosene 614. 3
    - oil 614. 3
- Straightedges, drafting 935.
- Strain insulators, composition, trolley 719. 63
    - globe, trolley 719. 63
    - porcelain 532. 22
    - wooden 429. 7
- Strainers, deck drain, brass 645. 21
- Stramonium 811.
- Stramonium extract powder 819. 1
- Strand, steel 603. 42
- Strand connector, cast iron 719. 62
- Strap hinges 617. 12
- Strap leather 066. 6
- Straps, cotton 319. 97
    - insulator spool 719. 62
    - leather 069. 5
    - lineman's safety 069. 3
    - webbing 394. 4
- Straw 113.
    - bedding 113. 9
    - oat 113. 2
    - rice 113. 4
    - rye 113. 1
    - wheat 113. 3
- Straw-color pigments 842. 88
- Straw hats 342.
- Straw mats and matting 349. 1
- Strawberries, canned 134. 11
    - fresh 132. 11
- Strawboard, corrugated 472. 25
    - jute lined, manila lined, vat lined 472. 15
    - sheet lined 472. 23
    - solid 472. 38
- Street blankets 339. 6
- Street-railway-track pavement 518. 31
- Street-sweeping brooms 981. 62
- Street washers (valves) 607. 6
- Stretchers 915. 33
- String beans, canned 126. 11
    - fresh 122. 11
- Stringers, wood 412. 1
- Stripes, service 369. 6
- Strips, alloy-steel 621. 32
    - aluminum and aluminum-alloy 631. 24
    - aluminum-bronze 647. 17
    - brass 644. 23
    - bronze 646. 23
    - copper 641. 23
    - copper-nickel 654. 3
    - German silver 655. 4
    - iron 604. 22
    - lead 651. 4
    - lumber 402. 41
    - Monel metal 654. 3
    - nickel-bronze 655. 4
    - nickel-copper 654. 3
    - nickel-copper-zinc alloy 655. 4
    - nickel-silver 655. 4
    - phosphor-bronze 647. 36
    - steel 604. 22
    - zinc 683. 3
- Strontium carbonate 839. 39
- Strontium salicylate 839. 39
- Structural iron. (*See* Structural steel.)
- Structural shapes. (*See* Shapes.)
- Structural steel 605.
    - alloy 621. 33
- Structural steel for bridges 605. 11
- Structural steel for buildings 605. 12
- Structural steel for cars and locomotives 605. 13
- Structural steel for machinery 605. 14
- Structural steel for ships 605. 15
- Structural timbers 412. 1
- Strut ends, aeronautic 724. 22
- Strychnine 811.
- Strychnine nitrate 811.
- Strychnine phosphate 811.
- Strychnine sulphate 811.
- Stub files 932. 6
- Stucco 516. 2
- Stud bolts 608. 31
- Stud link chains 603. 53
- Stuffing boxes, stern tube, ship 725. 42
- Stuffing tubes for electrical conduit 715. 11
- Subbases for roads 518. 14, 518. 2
- Subflooring, end matched 411. 9
- Submarine cable, electrical 715. 41
- Substations, outdoor, electrical 605. 22
- Subtropical fruits, dried 133. 5
    - fresh and preserved 131.
- Succotash, canned 126. 2
- Sucker rods for oil pumping 754.
- Sucrol 839. 9
- Sucrose 161. 1
- Suction hose 202. 46
- Sudan hay 111. 97
- Suet, prepared (mutton suet) 043. 1
- Sugar, brown 161. 5
    - corn 161. 4
    - granulated 161. 1
    - grape 161. 4
    - loaf 161. 3
    - lump 161. 3
    - milk 161. 7
    - powdered 161. 2
    - soft 161. 5
    - starch 161. 6
- Sugar bags 957. 19
- Sugar beets 123. 1
- Sugarcane sirup 164. 4
- Sugar-cured pork 012. 93
- Sugar pulverizing systems 789.
- Sugar sirup 164. 6
- Suit cases 958. 3
- Suitings, cotton 306. 3
- Suits, cotton 311. 6
    - woolen 368. 81
- Sulphated oils 040.
- Sulphite wrapping paper 477. 7
- Sulphite writing paper 478. 19
- Sulphonated oils 040.
- Sulphur 571.
    - medicinal 839. 9
- Sulphur apparatus, laboratory 918. 9
- Sulphur black (dye) 803. 10
- Sulphur insecticides 881. 21
- Sulphuric acid 821. 7
- Sulphurous acid 821. 7
- Sunflower oil 142. 7
- Sunset yellow FSF (food dye) 803. 13
- Superphosphates (fertilizers) 853.
- Supports, chemical laboratory 918. 9
- Surgeons' goods, rubber 204. 5
- Surgeons' operating gowns, cotton 311. 7
- Surgical beds, metal 613. 1
- Surgical dressings 398. 1–398. 3
- Surgical gauze 398. 2
- Surgical goods, hard rubber 205. 3
- Surgical instruments 915. 2
- Surgical silk 915. 55
- Surgical soap 871. 3
- Surgical tape 204. 12

Surveyors' instruments and supplies	916.
Suspension scales of lever type	793.5
Suspensions, trolley	719.63
Suture material	915.56
Sweat boxes	953.31
Sweaters, rayon	397.14
woolen	367.4
Sweeps, floor, hair	981.4
Sweet anise (vegetable)	124.5
Sweet basil extract	175.9
Sweet birch oil	813.9
Sweet corn (ear corn)	122.2
Sweet-pickle-cured pork	012.94
Sweetpotatoes, canned	127.52
fresh	123.52
Sweeteners, artificial, for foods	892.
Swimming pools	518.73
Swiss (cotton dress goods)	306.17
Swiss chard, canned	125.9
Switch boxes, electrical	715.12
Switch operating mechanisms and signals, railway	718.42
Switch ties, railroad	401.1
Switchboard cord	715.42
Switchboard slate	511.53
Switchboards, power and lighting	714.42
telephone	718.22
Switches, electrical	714.52, 715.22
lighting, automobile	722.32
railroad	606.3
snap	715.22
Switch gear, electrical	714.5
Switch stands, railway	718.41
Swivels, chain	603.57
Sycamore grading rules	400.39
Symbols, aeronautical	724.0
electrical	710.
heat and thermodynamic	700.
hydraulic	706.0
illuminating engineering	716.0
map	910.
mathematical	910.
navigational, marine and aerial	910.
photometric	716.0
plumbing	600.6
radio	718.60
telephone and telegraph	718.0
topographical	910.
Synchronous condensers	713.2
Synchronous converters	713.2
Synchronous motors	711.23
Syringes, fountain, rubber	204.26
hypodermic	915.27
Syrup cans	959.1
Syrups. (*See* Sirup.)	

T

T hinges	617.1^{2}
T slot bolts	608.3^{1}
T slot cutters	765.
T squares, drafting	935.
Table chinaware	532.1
Table cutlery	612.14
Table glassware	523.
Table linen	339.3
Table scrap meal	119.9
Table silverware	691.2
Table waters	176.3
Tablecloths, cotton	316.1
linen	339.3
Tables, kitchen, wooden	431.51
metal	613.6
office, wooden	435.3
Tablet bottles	955.1
Tablets, compressed, medicinal	819.9
hypodermic	819.9
Tableware, silver plated	691.2
Tachometer drive, aeronautic	724.22
marine engine	725.3
Tacks	608.14
Tag boards	474.5
Tag zinc	683.2
Tags, identification, electric wiring	715.35
shipping	489.
Tagua nuts	291.
Tail lights, automobile	722.32
Tail shaft bearings, ship	725.42
Tailskid shoe mountings, aeronautic	724.22
Talc, purified	872.1
Talcum powder	872.1
Tallow, animal	043.1
vegetable	142.92
Tamarack grading rules	400.25
Tamping bars	616.61
Tangerines	131.26
Tank caps, automobile	722.33
Tank cars	726.1
Tank covering, magnesia	707.43
Tank hoops, iron and steel	604.22
Tank hose	202.45
Tank staves	413.1
Tank stock lumber	413.1
Tank trucks, automobile	722.1
Tankage, digester	098.1

Tanks, air	956.2
automobile truck	722.1
dip, paint	956.2
expansion	614.1
gasoline, small capacity	956.2
steel	605.23
hot-water storage	614.4
ice, refrigerator car	726.2
oil (small engine and stove types)	956.2
oil, concrete	518.71
steel (large storage type)	605.23
oil burner (inside building type)	956.2
railway car	726.1
range boiler	614.1
tempering	956.2
water, steel	605.23
wooden	956.2
Tannic acid	821.9
Tanning extracts	234.
Tanning materials, synthetic	809.1
vegetable	231.
Tap bolts	608.31
Tap rivets	608.4
Tape, adhesive	204.12
asbestos, electrical	719.51
cotton	319.97
electrical insulating	719.56
friction	719.56
linen	339.4
measuring, engineers'	916.21
mechanics'	616.35
rubber, electrical insulation	719.55
sealing (paper)	479.2
silk	374.2
electrical insulating	719.56
rubberized	374.3
surgical	915.55
Taper fittings, automobile	722.33
Tapioca	109.9
Taps	615.15
shoe sole	067.6
tapper	765.
Tar (not including coal tar)	211.4
Tar, coal	505.3
Tar cement	505.35
Tar felt for roofing and waterproofing	505.36
Tar fillers for paving joints	505.15
Tar for cold application to roads	505.31
Tar for hot application to roads	505.32
Tar for repair work	505.34
Tar for road construction	505.33
Tar for roofing and waterproofing	505.36
Tar oil	505.37
medicinal	813.9
Tar pitch. (*See* Tar.)	
Tares, cotton	301.7
Tarpaulins	319.98
Tarragon	154.49
Tartar emetic	839.31
Tartaric acid	821.9
Tartrazine (food dye)	803.13
Taximeters	793.1
Tea	153.1
Teaberry oil	813.9
Teel oil	142.8
Tees, cast-iron pipe	607.14
malleable-iron pipe	607.2
Telegraph apparatus	718.1
Telegraph cable	715.41
Telegraph symbols	718.0
Telegraph table	613.6
Telegraph wire, copper	715.44
iron and steel	715.43
Telegraphs, ship, mechanical and electrical	718.39
Telephone cable	705.41
Telephone instruments	718.21
Telephone jack	718.29
Telephone plug	718.21
Telephone shelter box	429.9
Telephone switchboard cord	715.42
Telephone switchboards	718.22
Telephone symbols	718.0
Telephone wire, copper	715.44
iron and steel	715.43
Telescopes	914.2
Television	718.66
Telford foundation for roads	518.22
Tellurium metal, medicinal	839.39
Tender hose	202.45
Tennis balls	943.1
Tennis courts, concrete	518.9
Tennis nets	317.7
Tent duck	303.5
Tents	319.98
Terminal blocks, electrical distribution	715.39
telephone	718.29
Terminal lugs, battery tray, for electric vehicles	721.2
electrical distribution	715.35
Terminals, cable, electrical	715.35
marine oil	518.59
radio receiver	718.69
rigid, for airplane stays	724.22
storage battery	712.9

- Terneplate 604.31
- Terpin hydrate 822.9
- Terra cotta 534.24
- Terrazzo tile 511.3
- Terry towels 319.3
- Test lamps, oil 997.1
- Test screens, sheet metal 619.2
- Test sieves 645.31
- Test-weight cars 793.5
- Testing apparatus, radio 718.65
- Testing machines, calibration boxes for 919.9
  - proving rings for 919.9
- Testing machines for brick 534.10
- Testing machines for physical tests of materials 600.1
- Testing machines (drop) for steel rails 606.1
- Testing machines for textiles 770.
- Testing methods. (Look up individual commodity to which the test is applicable and the references thereunder.)
- Testing sieves, brass 645.31
  - bronze 646.52
- Tetanus antitoxin 812.
- Textile machinery 770–775
- Textile terms, definitions of 300.6
- Textile-testing machines 770.
- Textiles 300–399
  - asbestos 545.4
  - electrical insulating 719.56
- Theater furniture, wooden 437.
- Theobroma oil 813.8
- Thermal insulating paper and fiber 473.3
- Thermit welding 767.
- Thermodynamic symbols 700.
- Thermographs 919.7
- Thermometer bulbs, aircraft 724.26
- Thermometer fittings for dairy machinery 731.
- Thermometers 919.8
  - meteorological 917.5
- Thermostat connections, automobile 722.31
- Thimbles (pole-line hardware) 719.62
  - manila rope 619.9
  - wire rope 603.42
- Thinners, paint and varnish 848.
- Third-rail trolley systems 719.63
- Thorn apple 811.
- Thread, canvas work 302.25
  - cotton 302.2
  - flag making, cotton 302.21
  - flax, hemp, and ramie 331.3
  - shoe, linen 331.3
  - silk 372.1–372.8
- Thread cutting machines 763.
- Thread cutting tools 765.
- Thread gages 615.82
- Threads, drill pipe joint 607.0
  - pipe 607.0
  - screw 608.0
- Threads for fire hose couplings, hydrants, and valves 974.0
- Threads for oil and grease cups 794.
- Threshers 734.
- Thrown silk 372.0
- Thumb latch 617.22
- Thumb tacks 608.14
- Thyme 154.45
- Thyme extract 175.9
- Thyme oil 813.9
- Thymol 803.25
- Thyroid 819.4
- Thyroxin 819.4
- Ticking 304.8
- Tie-plates, railroad 603.1
- Tie-plug punch 616.8
- Tie plugs, wooden, railway 429.9
- Tie-rods, aeronautic 724.22
  - track 606.6
- Tie wires, copper 715.44
  - iron and steel 715.43
- Tierces, metal 951.23
  - wooden 951.24
- Ties, cedar 401.11
  - chestnut 401.12
  - cypress 401.13
  - fir 401.14
  - oak 401.15
  - pine 401.16
  - railroad 401.1
  - redwood 401.17
  - silk 375.1
  - walnut 401.18
- Tile, building, hollow clay 534.22
  - clay 534.2
  - concrete 516.4
  - drain, clay 534.21
    - concrete 518.62
  - floor, glazed clay 534.25
    - hollow clay 534.22
    - terrazzo 511.3
  - foundry refractory 534.12
  - furring, clay 534.22
  - glazed clay 534.25
  - gypsum 514.62
  - roof, clay 534.23
    - concrete 516.4
  - terrazzo 511.3
  - wall, glazed clay 534.25
- Tile duct, electrical 715.11
- Tile floors for buildings 518.56
- Tiled bathrooms 518.59
- Tiled ceilings 518.57
- Tiled wainscots 518.59
- Timber treating plants 400.49
- Timbers, bridge 412.2
  - mine 412.0
  - structural 412.
- Time-clock systems, electric 718.35
- Time release, railway signal 718.49
- Timer-distributor mountings, automobile 722.32
- Timothy hay 111.6
- Timothy seeds 241.
- Tin, phosphor 682.
  - pig 681.1
  - roofing 604.31
- Tin-base-bearing metals 692.1
- Tin chemical compounds 839.39
- Tin-coated sheets 604.31
- Tin hollowware 681.41
- Tin-lead solder 693.1
- Tin metal, medicinal 839.39
- Tin plating 600.3
- Tinners' tools 615.7
- Tinware 681.41
- Tips, rubber, for crutches 204.96
- Tire cord, cotton 303.8
- Tire fabric 303.8
- Tire-pump mounting, automobile 722.34
- Tire valves 206.3, 206.4
- Tires, airplane 206.2
  - automobile, pneumatic 206.1
    - solid 206.5
  - bicycle 206.2
  - cushion 206.5
  - motor cycle 206.2
  - solid, for automobiles and trucks 206.5
  - steel, railway car 611.53
  - wagon 729.4
- Tissue paper 476.
  - electrical insulating 476.23
  - stereotyping 476.25
- Tissne-paper napkins 476.31
- Tissue wrapping paper 476.4
- Titanium oxide (pigment) 842.1
- Tobacco 260–269
  - chewing 262.3
  - leaf 261.
- Tobacco and tobacco extract (insecticide) 881.24
- Tobacco manufactures 262.
- Tobacco wrappers 261.
- Tobin bronze rods 645.11
- Tobin bronze tubes 645.24
- Toggles, chain 603.57
- Toilet articles, hard rubber 205.4
- Toilet inclosures, marble 511.3
  - slate 511.52
  - soapstone 511.6
- Toilet paper 476.32
- Toilet-paper holder 645.4
- Toilet partitions, metal 617.79
- Toilet soap, Castile 871.11
  - hand grit 871.19
  - liquid 871.12
  - milled 871.13
  - white floating 871.15
- Toilets, cast iron 612.23
  - porcelain 532.23
- Toluene 801.2
- Toluidine blue O (biological stain) 803.19
- Tomato catsup 129.12
- Tomato juice 126.7
- Tomato juice, canned 126.7
- Tomatoes, canned 126.7
  - fresh 122.7
- Tongs, blacksmiths' and riveters' 615.55
  - laboratory 918.9
  - rail, tie, and timber 616.8
- Tongue, beef, canned 018.11
    - fresh 011.6
- Tonka extract 175.9
- Tool bags 957.14
- Tool chests and kits 958.2
- Tool elements for machine tools 765.
- Tool holder shanks and tool post openings 765.
- Tool steel 603.31, 603.32
  - alloy 621.35
- Tools, electric 711.24
  - hand, metal working 615.
    - other than metal working 616.
  - machine 761.
  - track 616.8
  - wooden 429.2
- Toothbrushes 982.1
- Tooth paste 872.2
- Tooth powder 872.2
- Toothbrush holder, brass 645.4
- Top-bow supports, automobile 722.37
- Topographical symbols 910.
- Topsoil pavements 518.38
- Toques, knit, woolen 367.3
  - rayon 397.13
- Torch, blow 615.72
  - illuminating 997.1
  - welding and cutting 767.

Torpedoes, track	863.
Touring cars, automobile	723.14
Tourniquets	204.13
Towel rack brackets, brass	645.4
Toweling, cotton	304.9
crash, cotton	304.91
linen	333.3
dish, cotton	304.94
huck, cotton	304.92
linen	333.3
paper	471.3
turkish	304.93
Towels, bath, cotton	319.3
linen	339.54
cotton	319.3
crash, linen	339.51
dish, linen	339.53
hand, cotton	319.3
linen	339.52
linen	339.5
paper	471.3
Terry	319.3
turkish, cotton	319.3
linen	339.54
Towers, steel	605.23
Toxin, diphtheria	812.
scarlet fever streptococcus	812.
Toxins	812.
Toxoid, diphtheria	812.
Toys	941.
Tracing cloth	392.12
Tracing paper	478.35
Track athletic goods and apparatus	943.94
Track bolts, alloy-steel	622.1
Track bolts, nuts, and washers	606.4
Track chisels	616.8
Track gage	615.82
Track material	606.
electric railway	719.63
Track pants, rayon	397.12
Track punch	616.8
Track scales	793.5
Track spikes	606.5
Track switching signals	718.42
Track tie-rods	606.6
Track tools	616.8
Track torpedoes	863.
Track transformers	713.5
Track work, special	606.3
Tractors, electric	721.2
industrial, electric	721.2
Tractors and tractor parts	729.5
Traffic signals	718.5
Traffic signs	998.
Traffic-zone paint, white	844.67
Tragacanth	217.
Trailers	729.2
Train lighting	716.39
Train line pipe	726.2
Train line receptacle and connectors	715.21
Tram, silk	372.0
Transfer paper	479.1
Transformer oil	504.8
Transformer vaults	518.59
Transformers	713.5
Transits	916.5
Transmission machinery	766.
Transmission parts, automobile	722.34
Transmitting apparatus, radio	718.63
Transom catches	617.42
Transom chains	617.5
Transom eyes	617.11
Transom hardware	617.5
Transom lifters	617.5
Transom operators	617.5
Transom pivots	617.5
Transom sash, wooden	423.2
Trap, cleansweep, brass	645.4
drain, cast iron	611.14
lavatory, brass	645.4
nonsiphoning, brass	645.4
P, brass	645.4
S, brass	645.4
sink, brass	645.4
steam	703.9
Trap and drain combined, brass	645.4
Tray cloths, cotton	316.4
linen	339.3
Tray plug, brass (plumbing)	645.4
Trays, battery, electric vehicle	721.2
hospital	915.46
laundry, porcelain	532.23
slate	511.52
soapstone	511.6
raisin and fruit drying	959.9
Treacle	163.3
Treating plants for timber preservation	400.49
Treatment of wood for preservation	400.4
Tree trimmers	616.72
Trees (nursery stock)	259.
Trestles, wooden	412.2
Triangles, drafting	935.
laboratory	918.9
Trichloracetic acid	821.9
Trim, interior, hollow metal	605.22
wood	411.42, 411.43
Trimmers, hedge	616.72
tree	616.72
Trimmings, plumbing, white metal	655.9
toilet and bath inclosure, brass	645.4
Trinitrophenol	802.1
Trinitrotoluol	803.32
Triple valve, railway brake	607.6
Triplex bags	957.19
Trisodium phosphate	871.23
Trolley bases	726.2
Trolley conveyors	745.1
Trolley crossings	719.63
Trolley ears	719.63
Trolley frogs	719.63
Trolley harps	726.2
Trolley material, railway	719.63
Trolley poles	726.2
Trolley suspensions	719.63
Trolley systems, overhead	719.63
Trolley wheels	726.2
Trolley wire, copper and bronze	715.44
Trolley-wire reels	715.36
Trolley-wire splicers	719.63
Trolley-wire supporting brackets	719.63
Trough, eaves, sheet metal	607.5
Troughs, watering, concrete	518.74
Trousers, cotton	311.4
wool	368.8
Trowels	616.93
Truck bolsters and arch bars, railway car	605.13
Truck pedestals, railway car	605.13
Truck side frames, railway car	605.13
Truck tires, solid rubber	206.5
Trucks, automobile motor	722.1
electric	721.2
except automobile and electric	729.3
fire, automobile	722.2
industrial, electric	721.2
motor, except electric	722.
tank, automobile	722.1
Trumpets	925.3
Trunking, grooved, cedar	402.9
Trunking and capping, electrical	715.11
Trunks	958.3
bathing, woolen knit	367.6
Trunnions, automobile engine	722.31
Tub stock, washing machine	413.9
Tube fittings, antomobile	722.33
Tuberculin testing of livestock	001.1
Tubes, absorption (chemical)	918.9
aircraft, alloy steel	622.3
steel	607.4
alloy steel	622.3
aluminum and aluminum alloys	631.42
boiler	703.2
brass	645.24
bronze	646.42
calcium chloride	918.9
centrifuge	918.9
colon, rubber	204.54
color comparison	918.9
combustion (chemical)	918.9
condenser admiralty metal	645.24
brass	645.24
Muntz metal	645.24
copper	642.24
distilling	918.9
electron	718.62
flexible, nonmetallic, for wire protection	715.13
flexible steel	607.7
funnel	918.9
gas, rubber	202.31
glass, laboratory	918.7
inner, for automobile tires	206.3
for motor-cycle tires	206.4
lavage	204.54
mailing	954.4
Muntz metal	645.24
naval brass	645.24
phosphor bronze	647.37
porcelain, for electrical wiring	532.22
pyroxylin	846.5
rectifier	718.62
rubber	204.6
steel, flexible	607.7
rigid	607.4
stomach, rubber	204.54
stuffing, for electrical conduit	715.11
tin	681.49
Tobin bronze	645.24
vacuum, radio	718.62
well, Douglas fir	429.9
steel	607.4
wrought iron	607.3
wrought iron	607.3
Tubes and tubing, laboratory	918.7
Tubes as containers	954.4
Tubing. (*See* Tubes.)	
Tubs, bath, cast-iron	612.21
porcelain	532.23
fiber	951.73
laundry	787.
slate	511.52

- Tubs, metal 951.71
  - wooden 951.72
- Tubular rivets 608.4
- Tubular-steel booms 607.4
- Tubular-steel poles 607.4
- Tucks packing 707.25
- Tumbler holder (bathroom), brass 645.4
- Tumblers, drying, laundry 787.
  - glass 523.4
- Tuna, canned 035.6
- Tung oil 848.2
- Tungsten powder 696.
- Tupelo grading rules 400.39
- Turbine-bucket wheels 611.56
- Turbines, steam 701.2
  - water 706.1
- Turbo generator, direct current 711.12
- Turkey, preserved or canned 018.4
- Turkeys, killed 015.5
  - live 007.2
- Turkish red (dye) 803.10
- Turkish toweling, cotton 304.93
- Turkish towels, cotton 319.3
  - linen 339.54
- Tumeric 154.19
- Turnbuckles 608.7
- Turnbuckles for blinds 617.43
- Turning squares 402.43
- Turnip greens, canned 125.9
  - fresh 121.9
- Turnip seeds 245.
- Turnips, canned 127.4
  - fresh 123.4
- Turns, cupboard 617.9
- Turntables, railway 605.21
- Turpentine 211.1
- Turpentine barrels 951.13
- Turpentine oil, medicinal 813.9
- Turpentine substitutes 848.7
- Twill, cotton 306.36
- Twine, baling, jute 326.
  - box, jute 326.
  - broom, cotton 302.33
  - cable laid, cotton 302.31
  - cotton 302.3
  - cotton seine 302.32
  - flax 331.21
  - hard fiber 331.20
  - hemp 331.22
  - impregnated, flax, hemp, and ramie 331.25
  - India 326.
  - Java 331.20
  - jute 326.
  - linen 331.21
  - manila 331.22
  - marlin 331.24
  - meat roping, hemp 331.22
  - meat tying, jute 326.
  - millers', jute 326.
  - New Zealand 331.20
  - sail, jute 326.
  - sailmakers', cotton 302.35
  - sewing, flax or linen 331.21
    - jute 326.
  - sisal 341.2
  - soft fiber (jute) 326.
  - wrapping, cotton 302.36
    - jute 326.
- Twine for tying meats, cotton 302.39
- Twine waste 390.5
- Twist, silk 372.5
- Twisted-link chain 603.54
- Twisted-link-vehicle chain 603.55
- Tympan paper 479.4
- Typesetting machinery 788.
- Typewriter chairs, wooden 435.2
- Typewriter ribbons 932.2

U

- Ukuleles 929.
- Ultra-violet absorbent glass 521.6
- Ultramarine blue (pigment) 842.3
- Umber (pigment) 841.7
- Underground cable, electrical 715.41
- Underground circuit materials 719.64
- Underground conduit construction, concrete 518.9
- Underwear, knit, cotton 309.4
  - rayon 397.12
  - woolen 367.2
  - woven, cotton 312.1, 312.5
    - woolen 368.7
- Unfired pressure vessels 605.23
- Uniform cloth, cotton 306.32
- Uniforms, cotton 311.6
  - marine, woolen 368.82
  - woolen 368.82
- Union duck, white 303.2
- Union suits, knit, cotton 309.4
  - rayon 397.12
  - wool and wool-cotton 367.2
- Unions, pipe, bronze 646.51
  - malleable iron 607.2
  - steel 607.4
- Universal joint hubs, automobile 722.34
- Universal motors, electric 711.21, 711.22
- Upholstery hair 362.3
- Upholstery leather 066.7
- Upland cotton 300.1
- Upper-shoe leather, except patent 061.
- Uranium nitrate 839.39
- Urinal drain, brass 645.4
- Urinals, hospital 915.47
  - porcelain 532.23
  - slate 511.52
- Urine-analysis apparatus 918.9
- Utensils, hospital 915.4
  - household 612.22, 612.3

V

- Vaccine, antityphoid 812.
  - smallpox 812.
- Vacuum brake connection, automobile 722.31
- Vacuum gauges 793.2
- Vacuum tank mountings, automobile 722.33
- Vacuum tube sockets, radio 718.69
- Vacuum tubes, radio 718.62
- Valve bronze castings 646.41
- Valve castings, alloy steel 622.5
- Valve stems, airplane tire, and motor-cycle tire 206.4
  - automobile tire 206.3
- Valves 607.6
  - poppet, automobile 722.31
  - pump, rubber 707.3
  - scupper 725.41
- Van Dyke paper (brown print) 478.34
- Vanes, wind 917.1
- Vanilla extract 175.4
- Vanilla for medicinal purposes 819.9
- Varnish, asphalt, air drying 846.41
  - baking 846.42
  - damar 846.12
  - electrical insulating 719.57
  - floor 846.33
  - interior 846.32
  - long oil 846.2
  - printer's and lithographer's 846.7
  - rubbing 846.31
  - shellac 846.11
  - short oil 846.3
  - spar 846.21
  - spirit 846.1
- Varnish brushes 982.2
- Varnish gums 846.6
- Varnish remover 849.4
- Varnished cloth 392.13
  - electrical insulating 719.56
- Varnished cloth-insulated wire, copper 715.44
- Varnished shoe leather 062.
- Vaults, burial, concrete 959.3
  - merchandise 518.59
  - record 518.59
  - transformer 518.59
- Veal, fresh 011.8
  - corned 018.12
  - dried 018.13
  - pickled 011.95
  - prepared, preserved, canned 018.1
  - smoked 011.94
- Veal carcasses and cuts 011.8
- Veal cuts 011.91
- Veal livers 011.4
- Veal loaf 018.16
- Vealers 001.2
- Vegetable barrels 951.13
- Vegetable baskets 952.11, 952.2
- Vegetable boxes, wooden 953.33
- Vegetable crates 954.33
- Vegetable food products 100–199
- Vegetable glue 282.
- Vegetable hampers 952.2
- Vegetable nuts 291.
- Vegetable oils 142., 813.
- Vegetable oils (rapid reference). (*See* index under oils for the oil desired.)
- Vegetable products, except food, fibers, and wood 200–299
- Vegetable shortening 142.95
- Vegetable tallow 142.92
- Vegetable tanned sole leather 063.6
- Vegetables 120–129
- Vegetables (rapid reference). (*See* index for the vegetable desired.)
- Vehicle chain 603.55
- Vehicle stock lumber 413.54
- Vehicles, electric 721.
  - except steam locomotives 720–736
- Veils, silk 378.
- Velvet, silk 373.26
- Velvet bean and pod, ground 119.9
- Velvet carpets, woolen 366.2
- Velveteens 308.2
- Veneer lumber 413.52
- Venetian (cotton goods) 306.28
- Ventilating equipment 792.2
- Ventilation of coal mines 750.
- Ventilators, sheet metal (building) 605.22
- Vermicelli 108.44
- Vests, cotton, knit (underwear) 309.4
  - rayon, knit (underwear) 397.12
- Vetch and cereal hay, mixed 111.5
- Viaducts, concrete 518.72

Vichy water 176.2
Vienna-style sausage, canned 018.25
Vinegar 154.71
Vinegar bottles, glass 523.1
Vines (nursery stock) 259.
Violet (biological stain) 803.19
Virus, hog cholera 812.
Viscosimeter, Engler 919.9
  Saybolt 919.9
Viscosity numbers 504.49
Vise clamps 615.43
Vises 615.41
Vitreous plumbing fixtures 532.23
Vitrified brick 534.11
Vitrified-clay liner plates (sewer) 534.29
Volley ball 069.1
Volley ball nets 317.7
Voltameters, silver 714.39
Voltammeters 714.32
Voltmeters 714.33
Volumetric flasks 918.9
Vulcanized fiber, electrical insulating 719.52

W

Wadding, cotton 319.1
Wagon bottoms 413.54
Wagon stock lumber 413.54
Wagons and wagon parts 729.4
Wainscots, tiled 518.59
Waists, boys', cotton 311.5
  women's, cotton 311.2
    silk 375.3
Wall board, gypsum 514.61
  paper board 472.24
Wall brush 982.3
Wall coping, clay 534.24
Wall hydrants 607.6
Wall plasters 514.63
Wall plates, brass (plumbing) 645.4
  cast iron (plumbing) 611.19
  cast steel (plumbing) 611.49
Wall-stippling brushes 982.2
Walls, head 518.66
  retaining 518.66
Walls for buildings 518.53
Wallpaper 475.4
Walnut catchup 129.12
Walnut-grading rules (lumber) 400.38
Walnut logs 401.9
Walnuts 135.7
Wardrobe locks 617.21
Wardrobes 431.14
Warehouse brooms 981.64
Warehouse forms 489.
Warehouses 518.51
Warm-air furnaces, house heating 614.4
Washers, bolt 608.6
  clothes 787.
  rubber 208.95
  track bolt 606.4
Washers for ball bearings 766.2
Washes, caustic, for borers 881.4
Washing compound, bottle 871.29
Washing machine tub stock lumber 413.9
Washing machines 787.
Washing soaps and powders 871.2
Washing soda 834.7
Waste, cotton 301.1
    absorbent 301.5
  wool 363.1
Waste material (bagging) 390.5
Waste material (metals) 600.2
Waste material (rags) 390.5
Waste material (twine) 390.5
Waste paper 470.1
Waste-paper receptacles, fiber 952.14
Watch cases 672.
Watch glasses (laboratory) 918.2
Watches 672.
Watchmen's report apparatus 718.31
Water, distilled 882.4
  drinking 882.3
  mineral 176.
  seltzer 176.1
  table, carbonated 176.3
  Vichy 176.2
Water bottles, rubber 204.23
Water-closet inclosures, marble 511.3
  slate 511.52
  soapstone 511.6
Water-closets, cast iron 612.23
  porcelain 532.23
Water colors 849.7
Water coolers 955.6
Water cress, canned 125.6
  fresh 121.6
Water filters (water works) 619.5
Water for chemical and medicinal purposes 882.4
Water gages, glass 526.6
Water glass (sodium silicate) 834.6
Water heaters, coal 614.1, 614.4, 614.9
  gas 614.2
  gasoline 614.3
  oil 614.3
  steam 614.9
Water hose 202.41–202.46
Water lights, self-igniting 997.5
Water meters 793.4
Water-pipe flanges, automobile 722.31
Water-polo balls, leather 209.91
  rubber 069.1
Water tanks 605.23, 956.2
Water treatments 882.
Water turbines 706.1
Water wheels 706.
Watering troughs, concrete 518.74
Watermelons, fresh 132.3
Waterproof cloth 392.4
Waterproof clothing 392.5
Waterproof duck 303.95
Waterproof fabrics, asphalt treated 505.16
Waterproof garnet paper 541.4
Waterproof wrapping paper 477.8
Waterproofing asphalt 505.16
Waterproofing compound, fabric 849.6
Waterproofing material for motors and concrete 516.3
Waterproofing tar 505.36
Watt-hour meters 714.34
Wattmeters, demand 714.38
Wave meters, radio 718.65
Wax, bees' 046.
  dental inlay casting 915.19
  illuminating 504.52
  paraffin 504.54
  sealing, electrical insulating 719.59
    for stationery 932.5
Wax beans, canned 126.11
  fresh 122.11
Wax paper (tissue) 477.5
Waybills, freight 489.
Wearing apparel. (*See* index for individual item of apparel.)
Weather stripping, rubber 209.6
Webbing 394.
  elastic 394.5
  jute 394.3
Webbing straps 394.4
Wedding bristol cardboard 474.4
Wedding writing paper 478.18
Wedges 616.60
Weighers, wheel load 793.5
Weighing bottles 955.1
Weighing machinery 781.
Weighing scales 793.5
Weights (weight throwing) 943.94
Weights, sash 617.5
Weights and measures 919.1
Welders' goggles 914.5
Welders' helmets 914.5
Welders' shields 914.5
Welding machinery 767.
Welding practice 767.
Welding rods, aluminum and aluminum alloy 631.31
  brass 645.11
  cast iron 611.19
  copper 642.11
  copper-nickel 654.53
  manganese-bronze 647.23
  Monel metal 654.53
  nickel-copper 654.53
  steel 603.26
Welding torches and connections 767.
Welding wire, alloy steel 622.4
  aluminum and aluminum alloy 631.31
  brass 645.12
  iron 603.41
  steel 603.41
Weldless chain 603.56
  aluminum 631.9
Welds, testing of 767.
Well tubing, Douglas fir 429.9
  steel 607.4
  wrought iron 607.3
Wethers 003.
Whale oil 041.1
Wharves 518.59
Wheat, grain 107.1
Wheat bran 118.2
Wheat breakfast foods 109.6
Wheat feed 118.1
Wheat flour 107.2–107.5
Wheat gluten 107.2
Wheat hay 111.2
Wheat middlings 118.3
Wheat mill feeds 118.
Wheat straw 113.3
Wheatstone bridge 714.36
Wheel chairs 438.4
Wheel control, airplane 724.25
Wheel-load weighers 793.5
Wheelbarrows 729.1
Wheels, abrasive 541.3
  aircraft 724.23
  automobile 722.35
  brush, dental 915.10
  bucket, turbine 611.56
  buffing 765.
  cast iron 611.18
  coping 541.3
  felt, dental 915.10
  grinding, dental 915.10
    industrial 541.3

- Wheels, industrial truck ... 722.35
  - locomotive, cast iron ... 611.18
    - cast steel ... 611.49
    - wrought steel ... 611.53
  - motor cycle ... 725.2
  - railway car, cast iron ... 611.13
    - wrought steel ... 611.53
  - sprocket ... 766.1
  - tractor ... 729.5
  - trolley ... 726.2
  - water ... 706.
  - wooden ... 429.8
- Whetstones ... 541.2
- Whipcord, woolen ... 365.12
- Whisk brooms ... 981.5
- Whisky ... 171.
- White arsenic (insecticide) ... 881.18
- White duck ... 303.2
- White floating soap ... 871.15
- White-lead paints ... 843.62
- White-lead pigments ... 842.64
- White pigments ... 842.87
- White potatoes, canned ... 127.51
  - fresh ... 123.51
- Whitewash ... 843.5
- Whitewash brushes ... 982.2
- Whiting (paint) ... 841.8
- Whiting, ceramic ... 546.
- Whole-milk cheese ... 022.41
- Whole wheat bread ... 108.1
- Whole-wheat flour and meal ... 107.4
- Wicks ... 399.7
- Wigan ... 306.27
- Wild-oat hay ... 111.99
- Willow grading rules (lumber) ... 400.39
- Wilton carpets ... 366.2
- Wilton rugs ... 366.1
- Wind sails ... 319.98
- Wind vanes ... 917.1
- Windings, electrical, oil proof ... 719.59
- Windmill lumber ... 402.43
- Window brushes ... 982.3
- Window cleaners' belts and anchors ... 069.3
- Window fasteners ... 617.43
- Window frames ... 423.9
- Window glass ... 521.
- Window locks ... 617.43
- Window lumber ... 413.8
- Window sash, wood ... 423.2
- Window screens ... 423.2
- Window shades ... 392.23
- Window spring bolts ... 617.61
- Window stop adjusters ... 617.5
- Windows, metal, hollow ... 605.22
  - steel ... 605.22
  - wooden ... 423.2
- Windshield glass ... 521.1
- Wines ... 173.
- Wings, airplane ... 724.22
- Wintergreen extract ... 175.5
- Wintergreen oil ... 813.9
- Wipers (cloths) ... 319.4
- Wire, alloy steel ... 622.4
  - aluminum, electric ... 715.44
  - aluminum and aluminum alloy ... 631.32
  - barbed ... 603.43
  - bonding, copper ... 715.44
    - copper-clad steel ... 715.43
    - galvanized steel ... 715.43
  - brass ... 645.12
  - brazing, brass ... 645.12
  - bronze ... 646.32
  - copper ... 715.41, 715.42, 715.44
    - annealed ... 715.44
    - hard drawn ... 715.44
  - copper-clad steel ... 715.43
  - copper-nickel ... 654.54
  - fence ... 603.43
  - fixture ... 715.44
  - flame proof, copper ... 715.44
  - flexible cord (electric) ... 715.42
  - German silver ... 655.5
  - heating element, electrical ... 715.43
  - high resistance, electric ... 715.43
  - insulated ... 715.41–715.44
  - iron ... 603.41
  - lamp cord ... 715.42
  - low resistance, electric ... 715.44
  - magnet ... 715.44
  - manganese-bronze ... 647.27
  - Monel metal ... 654.54
  - nickel ... 653.32
  - nickel-bronze ... 655.5
  - nickel-chromium ... 715.43
  - nickel-copper ... 654.54
  - nickel-copper-zinc alloy ... 655.5
  - nickel-silver ... 655.5
  - phosphor-bronze ... 647.38
  - reinforcement, steel ... 605.25
  - resistor ... 715.43
  - rubber-covered, copper ... 715.44
  - signal, copper ... 715.44
  - spring, brass ... 645.12
    - phosphor-bronze ... 647.38
- Wire, steel ... 603.41
  - stove (electrical), copper ... 715.44
  - telegraph, copper ... 715.44
  - telephone, copper ... 715.44
  - telephone cord ... 715.42
  - telephone line, iron or steel ... 715.43
  - tie, copper ... 715.44
    - iron or steel ... 715.43
  - trolley, bronze ... 715.44
    - copper ... 715.44
  - twisted pair ... 715.44
  - varnished cloth insulated, copper ... 715.44
  - weatherproof, copper ... 715.44
    - galvanized steel ... 715.43
  - welding. (*See also* Rods, welding.)
    - alloy steel ... 622.4
    - aluminum and aluminum alloy ... 631.31
    - brass ... 645.12
    - iron ... 603.41
    - steel ... 603.41
- Wire brads ... 608.12
- Wire brooms ... 981.3
- Wire brushes ... 982.3
- Wire cloth, brass ... 645.39
  - bronze ... 646.52
  - copper ... 642.4
  - Fourdrinier ... 645.39
  - iron and steel ... 603.43
- Wire crossings, line wires over railway ... 719.60
- Wire fences, steel ... 603.43
- Wire for concrete reinforcement ... 605.25
- Wire gages ... 715.40
- Wire glass ... 521.3
- Wire lath ... 605.24
- Wire nails ... 608.11, 608.12
- Wire raceways ... 715.11
- Wire rope, phosphor bronze ... 647.38
  - steel ... 603.42
- Wire-rope sockets and thimbles ... 603.42
- Wire spools ... 715.36
- Wireholder, porcelain ... 532.22
- Wiring, automobile ... 722.32
- Wiring practice ... 715.30
- Wood, preservative solutions for ... 801.3, 839.38
  - preservative treatment for ... 400.4
- Wood alcohol ... 822.5
- Wood blocks for pavements and floors ... 402.3
- Wood fillers (paint) ... 849.2
- Wood preservation ... 400.4
- Wood preservatives ... 801.3
- Wood pulp ... 400.5
- Wood screws ... 608.2
- Wood stains in oil ... 845.3
- Wood stains in turpentine ... 845.2
- Wooden applicator, surgical ... 915.28
- Wooden products ... 400–439
- Wooden products (rapid reference). (*See* index for individual commodity made of wood.)
- Woodenware ... 429.1
- Woodruff keys ... 608.52
- Woodworking machinery ... 784.
- Wool ... 361.1
  - glass ... 918.9
  - reworked ... 363.
- Wool fat ... 043.1
- Wool felt ... 365.98
- Wool grades ... 360.
- Wool-manufacturing machinery ... 773.
- Wool packing, journal box ... 363.1
- Wool top, grades ... 360.
- Wool waste ... 363.1
- Woolen cloth, beaver ... 365.11
  - Bedford cord ... 365.12
  - billiard ... 365.91
  - blue ... 365.21, 365.22
  - broadcloth ... 365.13
  - bunting ... 306.42
  - doeskin ... 365.14
  - fearnaught ... 365.15
  - flannel ... 365.93
  - gray uniform ... 365.25
  - green ... 365.26
  - kersey ... 365.16
  - khaki ... 365.27
  - melton ... 365.17
  - olive drab ... 365.24
  - prisoners' uniform ... 365.94
  - scarlet ... 365.23
  - serge ... 365.18
  - whipcord ... 365.12
  - white ... 365.23
- Woolen knit goods ... 367.1–367.7
- Woolen products ... 360–369
- Woolen products (rapid reference). (*See* index for individual commodity made of wool.)
- Woolen rag classification ... 390.5
- Woolen wearing apparel (not knit) ... 368.1–368.9
- Worcestershire sauce ... 129.13
- Worsted zephyr ... 363.2
- Wormseed, Levant ... 221.
- Wrapping paper, bogus ... 477.1
  - kraft ... 477.3, 477.4
  - manila ... 477.2
  - sanitary ... 477.5

- Wrapping paper, sulphite 477.7
  - tissue 476.4
  - waterproof 477.8
- Wrapping paper for crated furniture 477.9
- Wrapping paper for meats 477.9
- Wrapping twine, cotton 302.36
  - jute 326.
- Wrappings for freight shipments 959.6
- Wrenches and wrench openings 615.42
- Writing inks 933.1
- Writing paper, bond 478.11
  - flat 478.12
  - ledger 478.13
  - linen 478.14
  - papeterie 478.15
  - parchment deed 478.16
  - railroad 478.17
  - safety 478.33
  - sulphite 478.19
  - wedding 478.18
- Wrought-iron bars 603.1
- Wrought-iron forgings 611.3
- Wrought-iron pipe 607.3
- Wrought-iron pipe fittings 607.3
- Wrought-iron plates 604.14
- Wrought-iron rods 603.1
- Wrought-iron sheets 604.2

X

- X-ray apparatus and equipment 717.3
- Xylene 801.8
- Xylol 801.8

Y

- Ys, cast-iron pipe 607.14
- Yard lumber 400–412
- Yard lumber (rapid reference). (*See* index for individual lumber product, such as boards, ceiling, etc.)
- Yarn, asbestos 545.4
  - cotton 302.1
  - jute 324.1
  - rayon 397.0
- Yeast 155.5
- Yellow A B and yellow O B (food dyes) 803.13
- Yellow pigments 842.88
- Yoke ropes, cotton 302.48
- Yokes, coupler, railway car 605.13
  - feed in, trolley 719.63

Z

- Zephyr, worsted 363.2
- Zinc, ingot 683.1
  - gravity battery 712.5
  - plate and sheet 683.2
  - strip 683.3
- Zinc arsenite (insecticide) 881.19
- Zinc base die castings 683.41
- Zinc chemical compounds 839.38
- Zinc chloride treatment of lumber 400.4
- Zinc-coated steel sheets 604.32
- Zinc coatings 600.3
- Zinc oxide (pigment) 842.74
- Zinc sulphide (pigment) 842.7